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PROJECT PAPER: **BDS 413**
(**Product Design Specialization**)

**INCORPORATING TINGATINGA ART IN THE CREATION OF
AESTHETIC PRODUCTS FOR CHILDREN WITH AUTISM**

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14th April 2020

DECLARATION

I **Juddy Awuor Odera** hereby declare that this is my original piece of work and it has not been presented for the award of Degree in any other university. Where ideas of other scholars have been used, I have clearly indicated in a standard way.

To the best of my knowledge I have not committed any plagiarism or deliberate omission in the acknowledgment of original works by others.

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DEDICATION

I dedicate this research to all the children on the Autism Spectrum who have not had the understanding, support and patience that they needed and deserved.

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ABSTRACT

Background: Autism Spectrum Disorder is a developmental disorder characterized by social and communication impairments, combined with limited interests and repetitive behaviors. Research indicates that 1.7% of children, that is, 1 in every 59 children, are diagnosed with Autism Spectrum Disorder. Children who have Autism Spectrum Disorder display mild to severe impairments in social interaction and communication along with restricted, repetitive and stereotyped patterns of behaviors, interests and activities. Encoding and decoding messages during communication become difficult as an issue that arises from their neurodevelopment disorders.

The problem: There is a crucial need for facilitation of communication in regard to Autism. The condition impairs the communication process, leading to a cavity in the interaction between the children faced with Autism and their families and friends. In Kenya, therapists and support centers are challenged to find products that they can use for the treatment of children with Autism, with limited resources and financial constraints. The products, therefore, that are provided are not only limited but also do not fully explore the recovery process.

Objectives: The objectives of the paper was to determine and establish the challenges faced by autistic children in Nairobi, explore the challenges faced in aiding children affected by Autism, examine the available therapeutic products for children suffering from autism in Nairobi, establish how the Tingatinga art form and emotional design can be used to inspire products for the children and finally to propose aesthetic products that can aid autistic children in their communication process and interactions with others. **Design:** A case study model and descriptive research design, the research employed the collection and analysis of majorly qualitative data obtained through observation, photographs and interviews. **Setting:** The Differently Talented Society of Kenya and the Autism Support Center. **Results:** Better environmental and product development with the application of color, texture and balance and an improvement in user experience leads to better therapy results for autistic children. **Conclusion:** The findings established that the children's products have to be able to facilitate an experience between the children and the products themselves. They also have to be able to expose them to different environments and textures during their interaction. The products must also offer some kind of therapy to the children, neutralizing their sensory

and behavioral sensitivities. A great flaw was observed in the communication process that children within the autism spectrum are involved, and to facilitate proper communication then products have an upper hand in easing the process.

TABLE OF CONTENTS

| | | |
|--------|---|----|
| 1.0 | INTRODUCTION TO THE STUDY..... | 2 |
| 1.1. | Introduction..... | 2 |
| 1.2. | Background of Study..... | 2 |
| 1.3. | Problem Statement..... | 4 |
| 1.4. | Objectives of the Research..... | 4 |
| 1.4.1. | Main Objective..... | 5 |
| 1.4.2. | Specific Objectives..... | 5 |
| 1.5. | Research Questions..... | 5 |
| 1.6. | Significance of the Study..... | 7 |
| 1.7. | Scope of the Study..... | 7 |
| 1.7.1. | Thematic Scope..... | 7 |
| 1.7.2. | Geographical Scope..... | 8 |
| 1.8. | Limitations of the Study..... | 8 |
| 1.9. | Definition of Terms..... | 9 |
| 2.0 | LITERATURE REVIEW..... | 11 |
| 2.1. | Therapeutic Products..... | 11 |
| 2.2. | Autism Therapy and Treatment..... | 11 |
| 2.2.1. | Products for Autistic Children..... | 15 |
| 2.3. | Design is Communication..... | 18 |
| 2.4. | Tingatinga Art..... | 20 |
| 2.4.1. | Themes and Features..... | 20 |
| 2.4.2. | Tingatinga and Product Design..... | 23 |
| 2.4.3. | Impact of Tinga Tinga Art to Children..... | 23 |
| 2.5. | Emotional Design..... | 24 |
| 2.5.1. | Levels of Emotional Design..... | 25 |
| 2.5.2. | Connection Between Emotion and Design..... | 26 |
| 2.5.3. | Plutchik’s Wheel of Emotions: What it is and how it’s used..... | 27 |
| 2.5.4. | Kristen Visbal: The fearless girl statue..... | 28 |
| 3.0 | RESEARCH METHODOLOGY..... | 31 |
| 3.1. | Introduction..... | 31 |
| 3.2. | The Case Study Method..... | 31 |
| 3.3. | Descriptive Research..... | 32 |

| | | |
|--------|---|----|
| 3.4. | Population..... | 32 |
| 3.5. | Sample..... | 33 |
| 3.5.1. | Sampling Technique | 34 |
| 3.6. | Data Collection Methods..... | 35 |
| 3.6.1. | Observation..... | 35 |
| 3.6.2. | Interviews..... | 36 |
| 3.6.3. | Photographs..... | 36 |
| 3.7. | Data analysis | 36 |
| 3.7.1. | Content Analysis..... | 37 |
| 3.7.2. | Narrative Analysis | 37 |
| 3.7.3. | Visual Analysis | 37 |
| 3.7.4. | Thematic Analysis | 37 |
| 3.8. | Data Presentation Methods..... | 38 |
| 3.8.1. | textual Presentation..... | 38 |
| 3.8.2. | Photographs..... | 38 |
| 3.9. | Logical Framework | 38 |
| 4.0 | ANALYSIS & INTERPRETATION OF FINDINGS..... | 43 |
| 4.1. | Introduction | 43 |
| 4.2. | Challenges Faced by Children Within the Autistic Spectrum..... | 45 |
| 4.2.1. | Communication..... | 47 |
| 4.2.2. | Social Interaction | 48 |
| 4.2.3. | Behavioral Issues | 49 |
| 4.2.4. | Sensory Sensitivities | 50 |
| 4.3. | Challenges Faced in Aiding Children with Autism | 51 |
| 4.3.1. | Communication..... | 51 |
| 4.3.2. | Interaction | 52 |
| 4.3.3. | Behavioral Issues | 54 |
| 4.4. | Challenges Faced by Autistic Children During Product Interaction..... | 55 |
| 4.4.1. | Focus..... | 56 |
| 4.4.2. | Distraction..... | 56 |
| 4.5. | Autism Therapy Products..... | 57 |
| 4.5.1. | Color: | 57 |
| 4.5.2. | Texture:..... | 58 |
| 4.5.3. | Balance..... | 58 |

| | | |
|--------|--|----|
| 5.0 | SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS | 61 |
| 5.1. | Introduction | 61 |
| 5.2. | Summary of Data Analysis /Findings | 61 |
| 5.3. | Recommendations | 61 |
| 5.3.1. | Inspiration: Tingatinga Art | 62 |
| 5.3.2. | Materials | 65 |
| 5.3.3. | Recommended products..... | 68 |
| 5.4. | Suggestions for further study | 77 |

LIST OF FIGURES

| | |
|--|----|
| Figure 1.1: Map of Nairobi with a red dot specific to the site under study, the Differently Talented Society of Kenya; (Source: google maps) | 8 |
| Figure 2.1: The different aspects of autism tackled by therapy and therapeutic products; (Source: occupationaltherapyot.com) | 11 |
| Figure 2.2: Example of product used for play therapy for autistic children; (Source: centennialcounsellingservices.com)..... | 12 |
| Figure 2.3: An occupational therapy product; (Source: lifespan.org) | 13 |
| Figure 2.4: A product used for physical therapy for autistic kids; (Source: theracareaz.com) | 14 |
| Figure 2.5: Speech therapy products for autism; (thehealthsite.com) | 14 |
| Figure 2.6: Autism therapy balls that adhere to the colorful nature of the therapy products; (Source: autismspeaks.org) | 15 |
| Figure 2.7: Textured autism products for sensory stimulation; (Source: spectrumnews.org) | 16 |
| Figure 2.8: Products that achieve balance through suspension; (Source: the researcher) | 16 |
| Figure 2.9: Products that achieves balance while sitting; (Source: the researcher)..... | 17 |
| Figure 2.10: Autism Society of Kenya taking part in therapy activities; (Source: autismcenterkenya.org)..... | 17 |
| Figure 2.11: Sample of therapeutic products offered by the support center; (Source: the researcher)..... | 18 |
| Figure 2.12: Sculptures communicating certain emotions; (Source: artsy.net)..... | 18 |
| Figure 2.13: Another product facilitating communication with autistic kids; (Source: hauglandtherapyservices.com)..... | 19 |
| Figure 2.14: Product used to facilitate communication; (Source: autismlovetoknow.com)..... | 19 |
| Figure 2.15: Tingatinga paintings with a deep portrayal of nature; (Source: the researcher)..... | 21 |
| Figure 2.16: A Tingatinga painting showing the intricate background patterns applied by recent Tingatinga artists; (Source: the researcher)..... | 21 |
| Figure 2.17: Tingatinga paintings portraying the hornbill as a major feature; (Source: the researcher)..... | 22 |

| | |
|--|----|
| Figure 2.18: Tingatinga painting revealing the animal and its offspring; (Source: the researcher)..... | 22 |
| Figure 2.19: Embellishments of Tingatinga art on a product during a Tingatinga exhibition; (Source: the researcher) | 23 |
| Figure 2.20: The product design structure according to Aarron Walter; (Source: researchgate.net) | 24 |
| Figure 2.21: The three levels of design according to Don Norman; (Source: researchgate.net) | 25 |
| Figure 2.22: Plutchik's wheel of emotions; (Source: positivepsychology.com)..... | 27 |
| Figure 2.23: The Fearless Girl by Kristen Visbal originally at Wall Street facing the charging bull; (Source: nbcnews.com) | 28 |
| Figure 2.24: The Fearless Girl statue in its new home in front of the NYSE; (Source: newyorktimes.com)..... | 29 |
| Figure 4.1: Parents of autistic children at a parents-teachers meeting at the City Primary School; (Source: the researcher) | 43 |
| Figure 4.2: The City Primary School, with the products and environment provided for the autistic children; (Source: the researcher)..... | 44 |
| Figure 4.3: Another image of the City Primary School; (Source: the researcher)..... | 44 |
| Figure 4.4: A view of the plain environments for autistic children at the Mirema School, Nairobi; (Source: the researcher) | 45 |
| Figure 4.5: The environment provided for autistic children at the Mirema School; (Source: the researcher) | 45 |
| Figure 4.6: Chart showing the problems that autistic children face; (Source: the researcher)..... | 46 |
| Figure 4.7: Products used for speech therapy at City Primary School in Nairobi; (Source: researcher) | 52 |
| Figure 4.8: Two autistic children at the City Primary School during play therapy in the presence of two caregivers; (Source: the researcher) | 53 |
| Figure 4.9: A group of autistic and non-autistic children involved in sports at the Mirema School in Nairobi; (Source: the researcher) | 54 |
| Figure 4.10: Behavioral therapy executed through the use of a trampoline at the City Primary School; (Source: the researcher) | 55 |
| Figure 4.11: Behavioral therapy otherwise executed through an art class; (Source: the researcher)..... | 55 |

| | |
|--|----|
| Figure 4.12: Range of colors that are appropriate for autistic children; (Source: the researcher)..... | 57 |
| Figure 4.13: Products used by autistic children maintaining primary and secondary colors; (Source: the researcher) | 58 |
| Figure 4.14: Different textures on the step, balance balloon and trampoline; (Source: the researcher)..... | 58 |
| Figure 4.15: Two products that facilitate balance, one through sitting and one through suspension; (Source: the researcher)..... | 59 |
| Figure 5.1: Mood board showing the inspiration drawn to create the products; (Source: the researcher)..... | 62 |
| Figure 5.2: Sample of interpreted colors the researcher will apply in product development; (Source: the researcher)..... | 63 |
| Figure 5.3: Example of prints extracted from Tingatinga art; (Source: the researcher) | 64 |
| Figure 5.4: Simplistic naive forms of animals extracted from Tingatinga art; (Source: the researcher)..... | 65 |
| Figure 5.5: Several chewy tubes made for autistic children from silicone rubber; (Source: amazon.com) | 66 |
| Figure 5.6: An example of a silicone sheet; (Source: rubbersheetwarehouse.com) | 66 |
| Figure 5.7: Some of kids' therapeutic products made of wood; (Source: littlewoodenwonders.com)..... | 67 |
| Figure 5.8: Examples of therapeutic leather products; (Source: arktherapeutic.com).67 | |
| Figure 5.9: Sketches that show the proposed leather products; (Source: the researcher) | 75 |
| Figure 5.10: Sketches that show the proposed sculptural products; (Source: the researcher)..... | 76 |
| Figure 5.11: Sketches of the proposed ceramic products; (Source: the researcher) | 76 |
| Figure 5.12: Sketches of the proposed jewelry products; (Source: the researcher)..... | 77 |

LIST OF TABLES

| | |
|---|----|
| Table 1: Log table showing the products intended to be produced to answer research question 4 | 5 |
| Table 2: Table showing the population sample | 34 |
| Table 3: Logical Framework..... | 39 |
| Table 4: Table showing the range of recommended products | 68 |
| Table 5: Table showing the functions performed by each product..... | 70 |
| Table 6: Table showing the tools and production processes of the products..... | 72 |

PROJECT PAPER

CHAPTER 1

1.0 INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

According to David Mortensen (1972), communication is the most basic form of human interaction (Mortensen, 1972). Ideally, the process of exchanging information presented such as words, tone of voice, facial expressions and body language. David (1972) further states that it is one of the most essential parts of our daily human lives. Communication has been classified into verbal and non-verbal forms, each serving a very important part in basic human communication (Pierce, 2000). Some have argued for the simple but powerful notion that problems in life often arise from communication issues, rather than from serious mental disorders, strengthening their conceptual understanding through case studies and well-known literary examples (Paul Watzlawick, 1967).

There is a great barrier that forms between individuals and parties when communication is not smooth or easily understood by either of the parties involved within the communication circle, a barrier that is experienced by people who experience autism spectrum disorder and the people around them. Autism, also known as Autism Spectrum Disorder, is a complicated condition that includes problems with communication and behavior. People with autism have the greatest difficulty in decoding people's thoughts, feelings and emotions which in turn makes it hard for them to easily express themselves using words, gestures, facial expressions, emotions and touch (WebMD A. o., 2019). In a nutshell, Autism affects the individuals suffering from it as they are not able to fully communicate with other individuals or decode communication cues from others; as well as also affecting those around people suffering from Autism.

In most cases, communication therapy is an essential part of Autism treatment especially in regard to children under the age of 13. Design, however, is a very vital component of autism treatment due to the interaction of these children with their surroundings and in this case, more specifically, with their products. Good design doesn't happen by chance. Good design materializes from implemented purpose and intent. Design is more than simply looking interesting or cool; design is

communication. Just like an author or a speaker picks their words to convey a message, good designers choose the right visual foundations to also communicate a message (Toda, Design is Communication, 2017).

The research looks into the application of Tingatinga art form and emotional design in the creation of aesthetic products for children suffering from Autism Spectrum Disorder. It looks into product design as part of a key aspect in the treatment of children with Autism and aiding their communication process.

1.2. BACKGROUND OF STUDY

Research indicates that 1.7% of children, that is, 1 in every 59 children, are diagnosed with Autism Spectrum Disorder (Daily, 2018). Statistics also show that boys are four times more likely to suffer from autism than girls (1 in every 37 boys contrary to 1 in every 151 girls). Most children are still being diagnosed after the age of 4 though diagnosis can be done as early as the age of 2 (WebMD A. o., 2019).

ASD is a developmental disorder characterized by social and communication impairments, combined with limited interests and repetitive behaviors. Early diagnosis and intervention are key to improving learning and skills. Rates have been increasing since the 1960s, but scholars do not know how much of this rise is owed to an increase in real cases. There are other factors that can contribute, such as increased awareness, population tests, diagnostic aids, treatment and intervention services, better documentation of ASD behavior and changes in diagnostic methods (Daily, 2018).

Because autism runs in families most researchers think that certain genetic combinations may prompt the occurrence of autism. However, there are risk factors that increase the chance of having a child with autism (Bhandari, 2019). Although sometimes cited as a cause of autism, there is no evidence that vaccinations cause autism. The exact reason why autism happens isn't clear. Studies suggest that it may arise from abnormalities in parts of the brain that translate to sensory input and language processing.

Children who have Autism Spectrum Disorder display mild to severe impairments in social interaction and communication along with restricted, repetitive and stereotyped patterns of behaviors, interests and activities. Children with Autism find it difficult in encoding and decoding messages during communication, an issue that arises from their

neurodevelopment disorders (Stephen J. Blumberg, 2013). Some children with autism spectrum disorder have difficulty learning, and some have signs of lower than normal intelligence. Some children with this condition have higher learning skills - they learn faster, but have difficulty communicating and applying what they know in everyday life and adapting to social situations (Clinic, 2018). Because of the unique combination of symptoms in each child, severity can sometimes be difficult to detect. It is usually based on the degree of impairments and how they affect the ability to work.

In 2014, Pooja Panesar of the Kaizora Institute conducted a study on the perception and understanding of Autism among Kenyans. A link on the educational background and level of exposure to the concept of Autism was found whereby people from the rural areas with limited access to education have a higher perception of disabilities as a result of witchcraft or being cursed leading to the lack of search of proper treatment and care which further makes their daily lives difficult (Elliott, 2019).

1.3. PROBLEM STATEMENT

There is a crucial need for facilitation of communication in regard to Autism. The condition impairs the communication process, leading to a cavity in the interaction between the children faced with Autism and their families and friends. There exists a tendency to ignore the emotional attachment and reaction children have with the products that they use which would otherwise improve their recovery process.

In Kenya, therapists and support centers are challenged to find products that they can use for the treatment of children with Autism, with limited resources and financial constraints. Consequently, the products that are provided are not only limited but also do not fully explore the recovery process. There is also a vital need for the incorporation of East African art forms in the creation of the products the children use in Kenya, making the products more relatable to the children and more interesting to interact with.

1.4. OBJECTIVES OF THE RESEARCH

1.4.1. MAIN OBJECTIVE

The main objective of this research is to determine and establish the challenges faced by autistic children in Nairobi and how product design can be used to tackle these challenges.

1.4.2. SPECIFIC OBJECTIVES

1. To explore the challenges faced in aiding children affected by Autism at the Differently Talented Society of Kenya.
2. To examine the available therapeutic products for children suffering from autism in Nairobi.
3. To establish how the Tingatinga art form and emotional design can be used to inspire products for the children.
4. To propose aesthetic products that can aid autistic children in their communication process and interactions with others.

1.5. RESEARCH QUESTIONS

1. What challenges are faced in aiding children affected by Autism at the Differently Talented Society of Kenya?
2. What are the available therapeutic products available for children suffering from Autism in Nairobi?
3. How can the Tingatinga art form and emotional design be used to inspire products for the children?
4. What aesthetic products can aid children with autism in their communication process and social interactions?

The log table provided below indicates the items that will be produced by the researcher to facilitate objective 4 and answer research question 4 alike.

Table 1: Log table showing the products intended to be produced to answer research question 4

| UNIT | INSPIRATION | PRODUCT | MATERIAL | PROCESS | NO. OF PIECES |
|------|-------------|---------|----------|---------|---------------|
| | | | | | |

| | | | | | |
|-----------|----------------|------------------------|--------------------------|------------------------------|---|
| LEATHER | Tingatinga Art | Therapeutic nest | Leather, papyrus | Welding, Weaving, Sowing | 1 |
| | | Wall hanging | Leather, metal | Sowing, Welding | 1 |
| | | Bird seat | Leather, papyrus | Welding, Weaving, Sowing | 1 |
| | | Floor mat | Leather | Sowing | 1 |
| JEWELRY | Tingatinga Art | Windchimes | Metal, bone, glass beads | Welding, Assembling | 2 |
| | | Chewy tubes | Rubber, | Assembling | 3 |
| | | Lanterns | Metal, ceramic beads | Assembling, Welding, Weaving | 2 |
| CERAMICS | Tingatinga Art | Meditative lantern | Clay | Throwing | 2 |
| | | Plant pot set | | Hand building | 3 |
| | | How do you feel bowls | | Throwing, Carving | 3 |
| SCULPTURE | Tingatinga Art | Lotus flower sculpture | Soapstone | Carving | 1 |
| | | Bird sculpture | Wood, Metal | Carving | 3 |
| | | Caterpillar seats | Wood, Leather | Assembling, Carving, Sowing | 2 |
| | | How do you feel bowls | Wood | Assembling | 1 |

| | | | | | |
|--|--|---------------|------|---------------------|---|
| | | Balance stool | Wood | Carving, Assembling | 1 |
|--|--|---------------|------|---------------------|---|

1.6. SIGNIFICANCE OF THE STUDY

The results of the study are of great benefit majorly to children affected by Autism Spectrum Disorder. The intention of the study is to create products that are accommodating to Autism and more so, products that can ease their communication and interaction processes. This, therefore, enables them to not only encode messages to other individuals but also decode information being passed on to them.

The study also in turn benefits individuals that are surrounded by children suffering from Autism. This includes their families, friends, educators, among others. The study incorporates aspects of design that would allow for better communication channels between the children with Autism and the people around them.

1.7. SCOPE OF THE STUDY

1.7.1. THEMATIC SCOPE

The study mainly looks into the interaction between product design and health conditions and more specifically, Autism Spectrum Disorder. It further delves into how product design can be used to come up with unique and efficient therapeutic aid devices for people experiencing Autism and those surrounding the individuals. Ultimately, the research aims at bridging the gap between product design and communication and social interaction issues. It works towards revealing design, more specifically product design as a major form of communication.

1.7.2. GEOGRAPHICAL SCOPE

The research is mainly carried out in Nairobi County, more specifically at The Differently Talented Society of Kenya. Differently Talented Society of Kenya (DTSK) is a registered society that brings together parents of children with autism and children on the autism spectrum as well as professionals in the field of autism and special needs. Information gathered from the centers gives insight into the issue at hand. Another source of information is the Autism Support Center, an organization that aims at helping and creating awareness on Autism and the Autism Society of Kenya which facilitates the assistance provided to autistic children in Nairobi and Kenya at large. Figure 1.1 below shows the geographical region within which the research will be carried out.

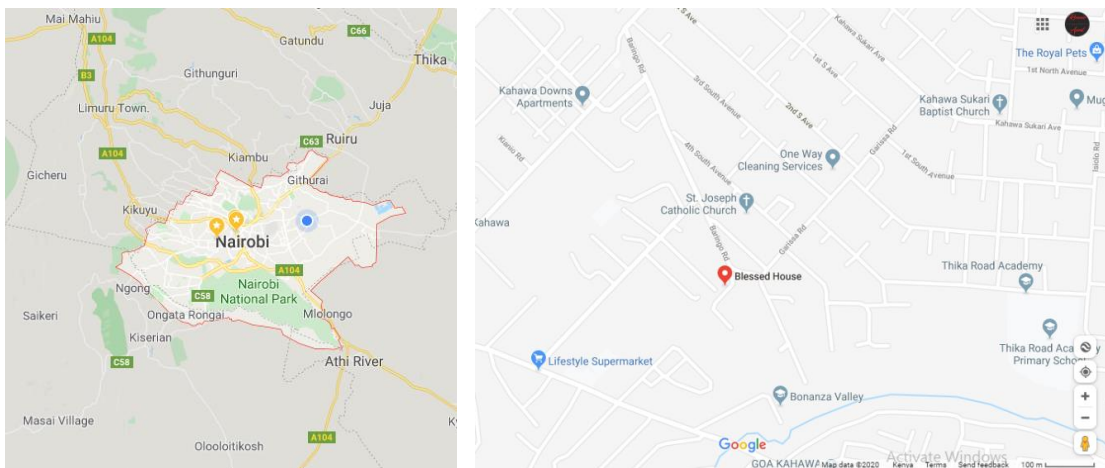


Figure 1.1: Map of Nairobi with a red dot specific to the site under study, the Differently Talented Society of Kenya; (Source: google maps)

1.8. LIMITATIONS OF THE STUDY

The main limitation that the study faced was communication. Due to the inability to decode and encode communication cues by children within the autism spectrum, the researcher was unable to get conclusive information from the affected. The researcher had to in turn only use observation and second-hand information from the caregivers of the children within the spectrum.

Another challenge that the study faced is the time factor as the research, being vast, required more time than that allocated. The allocated time was quite inadequate to be able to carry out extensive research and come to the relevant conclusions. Another

limitation was resources as the resources available to the researcher were also insufficient.

1.9. DEFINITION OF TERMS

Autism/ Autism Spectrum Disorder: Autism spectrum disorder is a condition related to the development of the brain that affects how one perceives and has relationships with others, causing problems in social and communication networks. The ailment also includes limited and repetitive patterns of behavior. The term "spectrum" in autism spectrum disorder refers to the wide variety of symptoms and severity.

Communication: It is a process in which information is exchanged between people through a common system of symbols, signs, or behavior. Operative communication is about more than just exchanging data. It's the conceptualization of emotion and intentions behind the information.

Tingatinga Art: It is a painting style that developed in Tanzania and later spread to most of East Africa. It is characterized by the heavy representation of East African wildlife, patterns and bright colors.

Emotional Design: Emotional Design is a design philosophy proposed by Don Norman that facilitates the creation of designs and products that elicit appropriate emotions, in order to create a positive experience for the user.

Therapy: This is the treatment of someone with mental or physical illness without the use of drugs or operations. It works towards helping a person get better from the effects of a disease or injury.

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CHAPTER 2

2.0 LITERATURE REVIEW

2.1. THERAPEUTIC PRODUCTS

Therapeutic products are those products that are intended to be used in or on human beings for a therapeutic purpose (Hauora, 2019). Examples of therapeutic purposes include providing the immune response to prevent, diagnose, monitor, alleviate, cure, or treat disease, illness, scarring, or injury (Hauora, 2019). Therapy involves the exchange of complex concepts, involving not only a detailed set of facts but also associated feelings. It is a combination of intense emotions and communication is a vital aspect of therapy, which can be achieved through the use of therapeutic products (Knapp, 2007).

In the case of Autism, where communication encounters some barriers, therapeutic products are preferred and eventually lead to the betterment of the autistic individuals.

2.2. AUTISM THERAPY AND TREATMENT

As positive outcomes for children and adolescents with either Asperger syndrome or high-functioning autism are related to the development of social-communicative competence, recognition of the developmental skills that contribute to this achievement is important (Laurent, 2004). Although social interaction skills play a major role, the stages of development in emotion regulation should be considered equally important (Laurent, 2004). There are no “cures” for autism, but therapies and other treatment

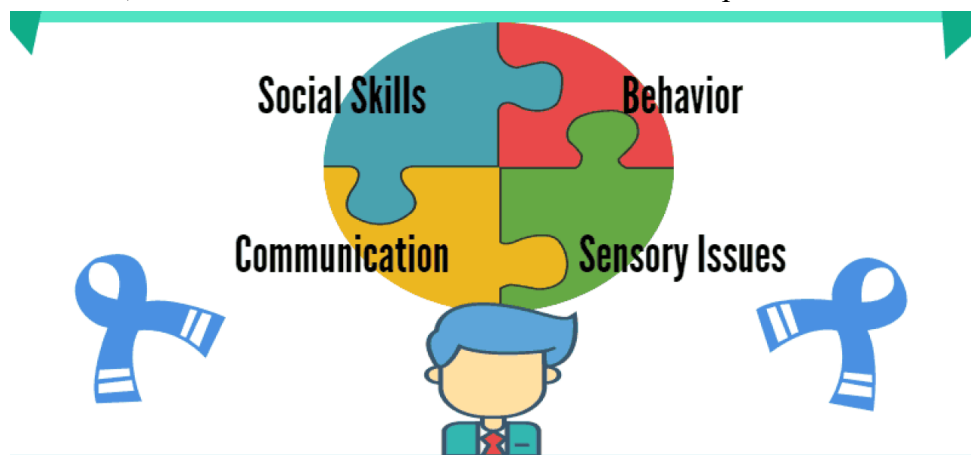


Figure 2.1: The different aspects of autism tackled by therapy and therapeutic products;
(Source: occupationaltherapyot.com)

considerations can help people feel better or assuage their symptoms. Figure 2.1 collectively shows the aspects of autism tackled by therapy.

Many treatment approaches involve therapies such as:

- Behavioral therapy

With regard to Autism, Behavioral therapy works towards treating the mental health issues associated with Autism. This type of therapy uses rewards to reinforce positive behaviors and teach new skills. It seeks to identify and help reverse harmful or negative behaviors. It applies to the idea that all behaviors are learned and that unhealthy behavior can be reversed. The focus of treatment is often on current problems and how to change them. This in turn allows for the containment of the challenges faced by the children suffering from autism.

- Play therapy

Children with autism may play differently than other kids. They'll likely focus on parts of a toy (like wheels) rather than the entire toy (WebMD, Play Therapy for Autism: What to Know, 2018). They don't do as well with pretend play. And they may not want to play with others. But to many children with autism spectrum disorder (ASD), playing is the way they express themselves -- their toys and their actions may become their words (Rudy, 2019) as seen in figure 2.2. Play can help children with ASD learn and connect with other people, both children, and adults.



Figure 2.2: Example of product used for play therapy for autistic children;

(Source: centennialcounsellingsercices.com)

- Occupational therapy

Children with autism and attention deficit hyperactivity disorder (ADHD) often show very different patterns of sensory processing to their peers and to children with other

special educational needs (Laurie, 2015). Occupational therapy involves the study of human growth and development and a person's interaction with the environment through daily activities. This information helps to promote independent living skills for people with autism and other developmental disorders (WebMD, 2018). Figure 2.3 shows an example of an occupational therapy product.

In the case of autism, the occupational therapist works to develop handwriting skills, good motor skills and everyday life skills. However, the most essential role is also to assess and target the child's sensory processing disorders. This helps to remove barriers to learning and helps students become more calm and focused (Laurie, 2015).



Figure 2.3: An occupational therapy product; (Source: lifespan.org)

- Physical therapy

Physical therapy includes activities and exercises that build motor skills and improve strength, posture and balance. For example, this type of therapy aims to help a child develop muscle control and strength so that he can play with other children as seen in figure 2.4. Problems with movement are common in autism spectrum disorder (ASD), and many children with autism receive physical therapy. However, there is no strong evidence that specific therapies can improve mobility skills in those with autism (Development, 2017).



*Figure 2.4: A product used for physical therapy for autistic kids;
(Source: theracareaz.com)*

- Speech therapy

People with ASD have major problems with both speech and non-verbal communication. They also find it difficult to interact socially and for this reason, speech therapy is a very vital aspect of Autism therapy. Speech therapy can address a wide range of communication problems for people with autism (WebMD, 2018). By improving communication and reducing related concerns, speech-language services often alleviate cool behaviors and improve academic and work success. Figure 2.5 shows speech therapy in practice with the aid of speech therapy products.



Figure 2.5: Speech therapy products for autism; (thehealthsite.com)

2.2.1. PRODUCTS FOR AUTISTIC CHILDREN

Products used for autism therapy adhere to the different therapy facets involved in autism treatment. Products used by the children mainly possess these qualities:

1. Colorful

A lot of the products used by autistic children have to maintain color in order to be able to stimulate certain sensory cues by the children as this does not come as automatic to them as to other children (Jamal, 2019). It is, however, important to note that the colors are not supposed to be too colorful in a way that it comes across as harsh to the children (Jamal, 2019). Harshly colorful environments or products may lead to the children being triggered acting as a shortcoming to the treatment rather than helpful. To achieve this, the colors are therefore maintained to primary colors and subtle shades of secondary ones (Jamal, 2019) as seen in figure 2.6.



Figure 2.6: Autism therapy balls that adhere to the colorful nature of the therapy products; (Source: autismspeaks.org)

2. Texture

Another quality of autism products is the presence of texture on the therapeutic products. This is also very vital as it helps to stimulate the sensory nerves of the children (Jamal, 2019). It is important to remember that autism is a neurosensory disorder, and this leaves the children with a challenge in normal sensory-related activities. In order to assist with that, their products are not only made with textured surfaces but are also

made with varying hardness (Jamal, 2019) as seen in figure 2.7. This, as well, helps strengthen their sensory nerves and muscles.



Figure 2.7: Textured autism products for sensory stimulation; (Source: spectrumnews.org)

3. Balance

Balance is another challenge faced by children with autism. It is therefore important for the products to be able to stimulate balance either through movement, balance through multitasking and balance through suspension (Jamal, 2019). Figure 2.8 shows examples of products that assist in balance through suspension while figure 2.9 shows products that facilitate balance while sitting.



Figure 2.8: Products that achieve balance through suspension; (Source: the researcher)



Figure 2.9: Products that achieves balance while sitting; (Source: the researcher)

Exemplar:

2.2.1.1. THE AUTISM SUPPORT CENTER KENYA

Autism Support Center (Kenya) is a nonprofit organization dedicated to improving the social economic lives of those living in the autism spectrum in Kenya. The organization not only assists in finding access to education, therapy and assessment and mentoring for families impacted by autism, it also provides therapy services to children suffering from Autism. The organization also coordinates a variety of intensive programs designed to engage youth with autism in a variety of services, aimed at improving their



Figure 2.10: Autism Society of Kenya taking part in therapy activities; (Source: autismcenterkenya.org)

social interaction and participation in vocational training opportunities plus improve their social support. Figure 2.10 shows therapy activities facilitated by the Autism Society of Kenya as figure 2.11 shows therapy products provided by the organization.



Figure 2.11: Sample of therapeutic products offered by the support center; (Source: the researcher)

2.3. DESIGN IS COMMUNICATION

Good design doesn't happen by chance, good design happens from executed purpose and intent (Toda, Design is Communication, 2017). Most people used to believe that good design was something that looked “cool”. But design is more than simply looking interesting or cool. Design is communication. As a writer or speaker picks their words to convey a message, good designers choose the right visual foundations to also communicate a message (Toda, Design is Communication, 2017). The main purpose and message of designing and transmitting that message successfully is what makes a good design, “good” (Toda, Design is Communication, 2017).



Figure 2.12: Sculptures communicating certain emotions; (Source: artsy.net)

Figure 2.12 above shows a perfect example of communication through product design. The sculptures above have been used to express or communicate certain emotions that would otherwise not be as effective as they are represented through design.

With regard to autism and the challenges that autistic children face during communication, it is therefore more effective and important to achieve communication through the use of design. In this case, design helps communication in both ways, from the autistic child to the non-autistic individual and vice versa. Autism affects verbal and non-verbal communication, social interaction and may lead to speech delay which brings about necessity in the use of products and/or designs that assist with these aspects of communication as seen in figure 2.13 and figure 2.14.



Figure 2.14: Product used to facilitate communication; (Source: autismlovetoknow.com)



Figure 2.13: Another product facilitating communication with autistic kids; (Source: hauglandtherapyservices.com)

Figure 2.13 and 2.14 show how design can be used to facilitate communication. Not only can design be used to literally allow communication but while interacting with the designs, the children allow non-autistic individuals time within which they can communicate.

2.4. TINGATINGA ART

Tingatinga paintings have become synonymous with East African art in recent times. From their bright colors to their nature themed concepts, they embody the East African theme. This painting style is Tanzania's most well-known style of African painting that began in the 1960s Edward Saidi Tingatinga, after whom the art style is named after. It later spread to other parts of East Africa, hence its recognition as East African art. Early Tingatinga paintings were traditionally composed in square format, featuring brightly colored animal motifs against a monochrome background. Before Edward Saidi Tingatinga became an artist, he worked as a bicycle repairman, with no formal training. On the onset of his art career, he used recycled materials such as ceiling boards and bicycle paints which made for a brilliant and highly saturated colors.

The Tingatinga painting style was majorly influenced by folklore and designs on the exterior walls of local houses. It is controversial whether Tingatinga's style is completely original or a derivative of traditional forms of East Africa. When Tingatinga died in 1972, his style was so popular that it had started a wide movement of imitators and followers, sometimes informally referred to as the "Tingatinga school". Edward Tingatinga established the Tingatinga style of art and handed it over to other Tanzanians who are now producing new paintings inspired by his work. The first generation of artists from the Tingatinga school basically reproduced the works of the school's founder imitating his naïve technique of simple images in bold color palettes painted in a flat style, usually composed of a single animal and with hints of surrealism.

2.4.1. THEMES AND FEATURES

As aforementioned, the main thematic aspect of the Tingatinga painting style is its emphasis on nature, focusing on East Africa's rich flora and fauna. When Edward Saidi Tingatinga began his indulgence in painting, his paintings mainly featured folklore and were influenced by animals and plants and this theme has been maintained by second and third generation artists of this style. There's a unique focus on the animals, majorly

the big five, which provides the main subject matter of the artworks as seen in figure 2.15.



Figure 2.15: Tingatinga paintings with a deep portrayal of nature; (Source: the researcher)

In addition to its emphasis on nature, another visible feature of the Tingatinga art is the **bright colors** and **intricate background patterns** that act as a vital element in Tingatinga art as seen in figure 2.16. None of the paintings contain dull colors. They are characterized by very lively colors that even boost the consumers' spirits during observation and interpretation of the art pieces as seen in figure 2.17.

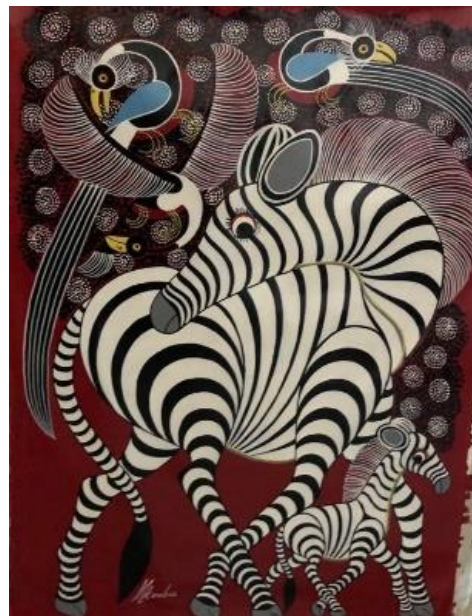


Figure 2.16: A Tingatinga painting showing the intricate background patterns applied by recent Tingatinga artists; (Source: the researcher)

There is one major image that can be traced to the original Tingatinga art and that is **the hornbill**. The hornbill is almost a trademark image in Tingatinga art and is found in almost every painting no matter the main subject as seen in figure 2.17. Traditionally, the hornbill was considered a messenger bird to the spirit world in many African societies. The works of the second and third generation Tingatinga artists feature the hornbill as part of the patterned backgrounds as well as some portraying it as the main subject matter.



*Figure 2.17: Tingatinga paintings portraying the hornbill as a major feature;
(Source: the researcher)*

A vivid feature of the current Tingatinga art pieces is the visible element of inclusion of **an animal or two and an offspring**. Looking through the different illustrations, it is important to notice that an offspring is always included and that emphasizes the concept of ‘mother’ nature shown in figure 2.18.

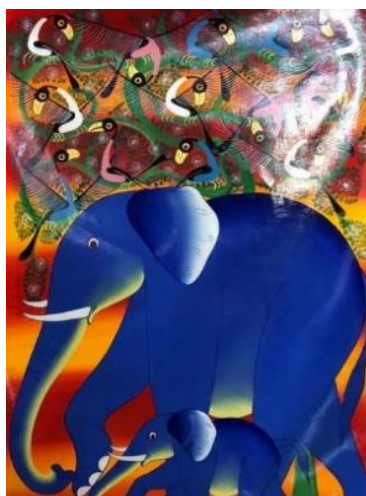


Figure 2.18: Tingatinga painting revealing the animal and its offspring; (Source: the researcher)

The forms of the animals are naïve and simplistic and are maintained between the parent and offspring with a difference in size implying the age of the animal. The offspring is smaller in size than the parent and is placed underneath the parent animal, showing that the offspring lies under the parent's wing.

Another important feature of Tingatinga art is **storytelling through the artform**. As aforementioned, Tingatinga art borrowed a lot from ancient folktales and therefore maintains this storytelling aspect through its portrayal of nature in form of a storyline. This theme is maintained throughout the different implementations of Tingatinga art as well.

2.4.2. TINGATINGA AND PRODUCT DESIGN

The Tingatinga painting style can be incorporated into product design easily. At the exhibition some trays were featured among other products such as pots that contain embellishments of the Tingatinga art style. This shows the application of the artform into product design and product development. Figure 2.19 shows embellishments of Tingatinga art on a product during a Tingatinga exhibition.



Figure 2.19: Embellishments of Tingatinga art on a product during a Tingatinga exhibition; (Source: the researcher)

The art style can also serve as an inspiration towards sculpting. With the simplistic forms of the nature themes, this easily supplies an inspiration for the creation of creative, kid friendly and interesting sculptures for different purposes.

2.4.3. IMPACT OF TINGA TINGA ART TO CHILDREN

Born from Tingatinga art are the Tingatinga tales targeted to children under the age of 12 which include the intricate Tingatinga storytelling techniques and its influence, which is nature. They include the bright colors of Tingatinga art and place emphasis on

narrating concepts through the use of animals and nature at large. The tales borrow from ancient folk tales which also were targeted to children during that era. The tales emphasize the impact of Tingatinga tales and art to children as they are artforms that children can easily relate to. The naïve portrayal of nature and storytelling makes it simple for them to comprehend and allows for effective dissemination of information through the Tingatinga artforms.

2.5. EMOTIONAL DESIGN

With the emergence of design and the design process it is no longer satisfactory to design a product that just works; products need to have an remarkable user experience (Chapman, 2009). This has brought about the emergence of **emotional design**. Emotional design strives to create products that prompt suitable sentiments, in order to create a positive experience for the user (Foundation, n.d.). There is currently interest in the emotional relationship between a product and its user.

It is important for the designer to be able to empathize with certain groups of users in order for their designs to create this emotional connection (McDonagh-Philip, 2000).

Aarron Walter (2011), states that emotional design, when paired with solid functionality, will help fill in the gaps and work as a trust agent in the user experience as they interact with your design. When performance needs to be driven, emotional formation creates space for the user to connect and provide feedback (Walter, 2011). According to his book, emotional experiences make a profound imprint on the consumers' long-term memory.

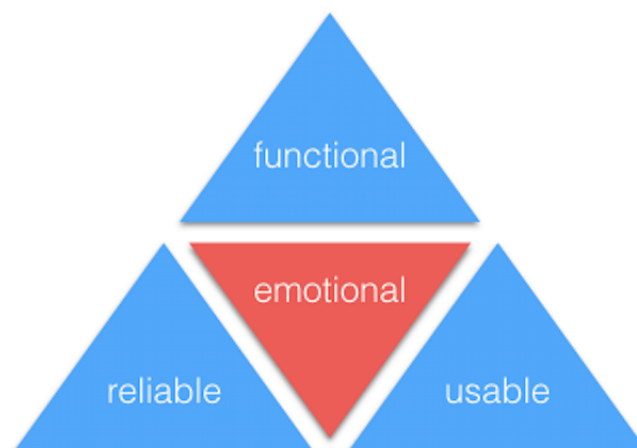


Figure 2.20: The product design structure according to Aarron Walter; (Source: researchgate.net)

The figure 2.20 above shows the structure of Product Design according to Aarron Walter, which places great emphasis on designing around emotions.

Researchers have developed various ways of understanding what emotional design should be and the role of emotions in the construct. Some of them view emotional design as a tool that designers can use to convey their messages and feelings, while others believe that it is a form of experience and reaction when one uses something (Ho, 2012). Meanwhile, some researchers have regarded emotional design as a means to establish consumer expression, and as a representation of the users' identity or personality (Crossley, 2003).

2.5.1. LEVELS OF EMOTIONAL DESIGN

In his book *Emotional Design* (2004), Don Norman proposes that the emotional system has three distinct, yet interconnected stages, each of which contributes to our knowledge of the world in some way. He explores these different levels of creativity that capture how people respond emotionally to visual experiences: **visceral**, **behavioral**, and **reflective** (Norman D. , 2004) shown in figure 2.21.



Figure 2.21: The three levels of design according to Don Norman; (Source: researchgate.net)

2.5.1.1. VISCERAL EMOTIONAL DESIGN

A visceral reaction is triggered by an initial sensory experience; it concerns itself with appearances. It is that first impression that sets the mood and initial framing for which you'll explore everything else. Visceral design includes the user's pre-conscious state, the product's initial attractiveness, and the user's overall feelings (Baker, 2019). This

level of design refers to the perceptible qualities of the object and how they make the user/observer feel.

2.5.1.2. BEHAVIORAL EMOTIONAL DESIGN

A behavioral reaction is how we feel as we are immersed in the product experience. It is how we react to our product interactions and derive value from the products we use, also more commonly known as usability. Behavioral design is probably more often referred to as usability; it has to do with the pleasure and effectiveness of use (Komninos, 2019). Behavioral design includes usability, product function, performance, and effectiveness of use.

2.5.1.3. REFLECTIVE EMOTIONAL DESIGN

A reflective reaction is how we feel after we have been immersed in the experience. It is how we remember the experience itself and how it made us feel. It determines whether we want to try that experience again or shun it all together. This is the highest level of emotional design; representing the conscious thought layer, where we consciously approach a design; weighing up its pros and cons, judging it according to our more nuanced and rational side, and extracting information to determine what it means to us as an individual (Komninos, 2019). Reflective thinking allows us to synthesize and rationalize environmental information to influence the behavioral level. To be an exceptional designer, it is not enough to just understand how users are reacting the way they are— one must understand why.

2.5.2. CONNECTION BETWEEN EMOTION AND DESIGN

Everything has been designed in some way and all design ultimately produces an emotion upon interaction between the consumer and the design (Philips, 2019). It is often overlooked that consumers have some, if not plenty, of emotional attachment to products that they use. Don Norman (2013), states that Design is really an act of communication, which means having a deep understanding of the person with whom the designer is communicating (Norman D. A., 2013). The reward for products that connect with customers' emotions in a positive way can be substantial. How can designers identify the powerful motivators that lead to making those connections (Philips, 2019)?

There is an old adage in the design world that interaction with any product produces an experience (emotion). In product design, for example, one can find its final products that are emotional to their viewers, whether good or bad, entertaining or frustrating. Everything around us is designed in some way and every composition expresses emotions. People experience the spiritual reaction of our nature for a moment: a like or not to like, to please others, to happiness, to frustration (Philips, 2019).

Product design looks at how the user interacts and responds to the interface, service or product. That answer is emotional. User experience designers not only strive to design products that are functional, functional but also produce a specific emotional outcome for the user while using the product - often a good one - and try to maintain it throughout the user journey. When we talk about emotional construction, we talk about how a product's design, or interaction, affects the user.

2.5.3. PLUTCHIK'S WHEEL OF EMOTIONS: WHAT IT IS AND HOW IT'S USED

Psychologist Robert Plutchik came up with a wheel of emotions seen in figure 2.22 which stands as a resource for understanding emotions and using them as a resource, and in this case, in the world of design. states that there are 8 basic emotions: joy, trust, fear, surprise, sadness, anticipation, anger, and disgust (Donaldson, 2017).

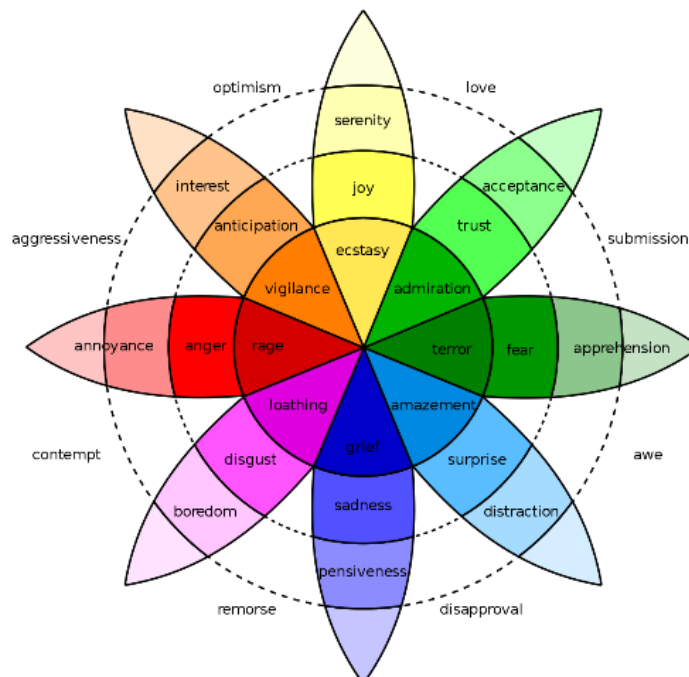


Figure 2.22: Plutchik's wheel of emotions; (Source: positivepsychology.com)

The wheel of Plutchik's feelings reflects these 8 basic feelings and the various ways in which they are related to each other, including which ones are opposites and which can easily be converted to another (Plutchik, 2003). The range of his emotions suggests that while it is difficult to understand the thousands of different emotions, one can learn how to master basic emotions and act accordingly.

According to Plutchik, these emotions influence people's actions. This is why the tool is so useful. It enables the user, and in this case the designer, to visualize emotions, and understand which combinations of emotions create certain outcome (Donaldson, 2017). According to Plutchik's Sequential Model, emotions are activated due to specific stimuli, which set off certain behavioral patterns. It is important during the designing of products that designers realize what emotions are stimulated by specific behavior, and foster their products in relation to that (Karimova, 2019).

2.5.4. KRISTEN VISBAL: THE FEARLESS GIRL STATUE

The "Fearless Girl" seen in figure 2.23 is a statue, now in Lower Manhattan that was commissioned by State Street Global Advisors, an asset management company, to raise awareness of an initiative to increase the number of women on corporate boards. The girl is seen standing akimbo facing a charging bull coming at it, with an interpretation of bravery by the young bronze girl. To emphasize its intent and message, the statue was done by a woman, Kristen Visbal.



Figure 2.23: The Fearless Girl by Kristen Visbal originally at Wall Street facing the charging bull; (Source: nbcnews.com)

While the statue has received some backlash, such as insinuations that it tarnishes the bull's positive message, a lot of people relate to the sculpture and what it stands for (Wiener-Bronner, 2018). With its original location, in the middle of Wall Street, it represented the might of the capitalist system in the States and the need for gender equality in said capitalist system. It was moved and now faces the New York Stock Exchange, still maintaining its relevant message shown in figure 2.24.

Most people, however, claim that it is hard not to be affected by the courageousness of the statue's pose and the defiant placement of the girl's hands on her hips. The experiences by the consumers of this statue have been made exceptional by generating an emotional response and message through its design (Gray, 2018). Some refer to it as the epitome of emotional design as it not only requires one to view it but facilitates the creation of a connection. The "Fearless Girl" was initially intended to stay in New York for seven days but earned a place in people's hearts and in doing so, earned the opportunity to extend her stay (Li, 2018).



Figure 2.24: The Fearless Girl statue in its new home in front of the NYSE; (Source: newyorktimes.com)

PROJECT PAPER

CHAPTER 3

3.0 RESEARCH METHODOLOGY

3.1. INTRODUCTION

Research design is a framework of methods and procedures/ techniques chosen by a researcher to combine components of research in a reasonable and logical manner for efficient and effective handling of the research problem (Bhat, n.d.). It gives insights into how a research should or will be conducted using certain methodology. It is the set of tools used in collecting, analyzing and presentation of data specified in the problem research. It involves an individual strategy chosen to integrate different parts of the research in a harmonious and logical way, thereby ensuring that the individual will best solve the research problem. The research problem determines the type of design one should use, not the other way around (Bhat, n.d.).

The choice of research design for the study was based on the problem under study, assumptions the researcher brought and target audience of the study as well. In this research, the researcher applied two types of research design: **the case study research design** and **descriptive research**.

3.2. THE CASE STUDY METHOD

The researcher's case study was the Differently Talented Society of Kenya (DTSK). DTSK is a registered society that brings together parents of children with autism and children on the autism spectrum as well as professionals in the field of autism and special needs. The society was established in May 2016 by a group of parents with children on the autism spectrum, as a psycho-social support group set to offer support to autistic children and their parents. The subjects from the case study included children suffering from Autism, committee members and the parents of autistic children. The researcher observed the children and the society at large with an aim to understand their situation and look into their life as affected by autism as well as those of their parents.

Case study is a research methodology, typically seen in social and life sciences. There is no one definition of case study research. However, very simply, a case study can be defined as an intensive study about a person, a group of people or a unit, which is aimed to generalize over several units (Twycross, 2017). Crowe (2011), defined the case study

as a phenomenon that involves reviewing a particular phenomenon or event in its natural environment. It is an in-depth, detailed study of an individual or a small group of individuals and is mainly qualitative in nature. Robert Yin suggests that the case study refers to an event, entity, an individual or even a unit of analysis (Yin R. K., 2009). It is an empirical inquiry that investigates a contemporary phenomenon within its real-life context using multiple sources of evidence. During the use of a case study approach, the focus is on the evaluation and interpretation of an item.

3.3. DESCRIPTIVE RESEARCH

Based on the qualitative nature of the research, the researcher opted to incorporate the use of descriptive research which would further anchor the information collected through the case study method. More so, the researcher used this research design because it involves observing and describing the behavior of a subject without influencing it in any way (Shuttleworth, 2008). This allowed the subjects and phenomenon to remain true to their actual states, facilitating authenticity of the information collected which would eventually lead to the proper navigation of solution-finding.

According to Helen L Dulock, (Dulock, 1993), descriptive research can be defined in a variety of ways such as: providing exposure or an accurate account of the characteristics of a particular person, situation or group; studies that are a way of finding new meaning and defining existing ones. Descriptive research describes systematically and precisely the characteristics of a given population or a particular area of interest (Dulock, 1993).

3.4. POPULATION

Based on the research at hand, the population under study included autistic children, their parents and committee members of societies that support autism in Nairobi. According to statistics, the number of autistic children in Nairobi, though on the rise, stands at 1 in every 59 children. This means that 1.7% of the children population in Nairobi are crippled by autism (2018).

A target population refers to the entirety of a group of individuals or objects which a researcher is interested in investigating and drawing conclusions from. The target population usually has varying characteristics but carries a general quality or

characteristic that captures the attention of the researcher in regard to his/her study and problem under investigation. In the case of varying characteristics within the target population a sample is chosen.

Based on the 2019 census report of Kenya (KNBS, 2019), with an average of 2 children per household in Nairobi and a total of 1,506,888 households in Nairobi, the total number of children is estimated at 3, 013,776. This therefore leads to the revelation that about 51,234 children suffer from autism knowingly or unknowingly (KNBS, 2019). The numbers presented are based on estimated statistics.

The number of children suffering from autism is against the total population of 4,397,073 individuals in Nairobi (KNBS, 2019). This number eventually leads to the 4,345,839 individuals who have a chance of interaction with the autistic children, of which 2,198,536 are possible parents of children with autism.

Present in Nairobi are three Autism societies which members that tend to the autistic children. These societies include the Differently Talented Society of Kenya, the Autism Society of Kenya and the Autism Support Center. The DTSK contains 50 involved parents and 5 committee members. The Autism Society of Kenya as well contains 5 committee members and 15 support staff members, with the Autism Support Center containing 4 founding members, 7 supporting members and works with a total of 100 kids. This brings the total population of 14 committee members of the societies supporting autistic children, 50 involved parents and 22 supporting staff members. The societies also have access to a total of 200 children on the autism spectrum.

3.5. SAMPLE

A sample refers to a small portion of the entire group or population chosen by the researcher to give insight into what the whole population is like. The features of the sample are analyzed and show what the whole is like.

The table below shows the description and number of samples within the population sample:

Table 2: Table showing the population sample

| Description | Population at the Case study (Estimate) | Number of accessible sample |
|---|--|------------------------------------|
| Autistic children | 200 | 10 |
| Committee members | 14 | 7 |
| Parents of the autistic children | 50 | 13 |
| Supporting staff members at the society | 22 | 5 |
| TOTAL | 286 | 35 |

3.5.1. SAMPLING TECHNIQUE

For this research, simple random sampling was used to determine the sample population. The sampling was done based on the geographical scope of the study, which is Differently Talented Society of Kenya, and more so, the availability of the subjects under study. The researcher would visit the site on any given occasion and the present subjects would be chosen as the samples for the research study. In regard to the autistic children, the samples chosen were those on their way to overcoming communication issues which is the main challenge experienced by autistic children. Those children on the spectrum that did not experience unease of being observed and photographed were those that the researcher focused on.

Simple random sampling is a sampling method in which every human being has even a higher probability of being selected from a sample. Here the selection of objects is entirely dependent on chance or probability and in this way the use of models is sometimes known as a probability model (Bhat, n.d.). The main feature of this sampling method is that all samples have the same probability of being selected.

3.5.1.1. SIMPLE RANDOM SAMPLING METHODS

The following steps are involved in selecting simple random sampling:

1. A list of all the members of the population is prepared initially and then each member is marked with a specific number (for example, there are n members then they will be numbered from 1 to N).
2. From this population, random samples are chosen using two ways: random number tables and random number generator software. A random number generator software is preferred more as the sample numbers can be generated randomly without human interference.

In the case of the research, however, the random number generator was not used due to availability.

3.6. DATA COLLECTION METHODS

The researcher used various data collection methods in order to thoroughly investigate the problem of autism spectrum disorder in Nairobi. Most of these methods are qualitative data collection methods.

3.6.1. OBSERVATION

The researcher specifically used **non-participant observation** at the Differently Talented Society of Kenya and its associated spaces provided for autistic children. This involved detached observation with no participation on the part of the researcher. The researcher observed the children in their natural environment and saw what challenges they face due to Autism. She also observed their mannerisms, their interactions with the products provided for them and their social interactions

Observation is a systematic data collection approach. Researchers use all their senses to examine people in natural settings or situations. Forum recognition includes: long-term involvement in a setting or social setting.

This method allowed the researcher to make her observations from a third person's perspective and allowed her to see their natural actions and interactions with their activities. The researcher would then take down notes and take photos of what activities the subjects were involved in, allowing for proper storage of information which would easily be retrieved for data analysis and presentation.

3.6.2. INTERVIEWS

For the purpose of the study the researcher specifically focused on using **semi-structured interviews**. In the semi-structured interview, the researcher used an interview guide with a predetermined set of questions which the interviewees answered to in their own words. The interview guide served as a checklist to ensure that all respondents provide information on the same topics but are not limited to specific answers (Zarinpoush, 2006). The interviews would then be recorded, and notes taken down to allow the researcher to store whatever information he collected for analysis and presentation.

An interview is generally a qualitative research technique which involves asking open-ended questions to converse with respondents and collect elicited data about a subject (Bhat, n.d.). The interviewer coordinates the process of the conversation and asks questions and the interviewee or respondent responds to those questions. Interviews can be conducted face-to-face or over the phone and with current technological advances using applications such as skype, among others (Zarinpoush, 2006). Interviews are a useful way when there is a need to gather in-depth information about people's thoughts, thoughts, experiences and feelings. They are useful when the topic of research is related to issues that require complex questions and thorough investigation.

3.6.3. PHOTOGRAPHS

Visual research methods are those that incorporate some kind of imagery into the research process. The researcher would take pictures of the current state of therapeutic products and images of the environment provided by the Differently Talented Society of Kenya and its associated societies. Images can constitute the research data, or the tools through which research data is analyzed, or the medium via which research results are communicated. Visual research methods tend to be defined with reference only to these sorts of qualitative, small-scale projects, in which images are embedded into interviews or ethnographic methods.

3.7. DATA ANALYSIS

3.7.1. CONTENT ANALYSIS

Content analysis involves the documentation of data collected in the form of documents, media or material. Content analysis is one of the most common methods of data analysis used to analyze written data. This method of research is used to make repetitive and practical issues by translating and documenting text (Georgia, 2012). By systematically evaluating texts, qualitative data can be converted into quantitative data. Following the use of the case study method, the researcher opted to use **content analysis** as the form of data analysis.

3.7.2. NARRATIVE ANALYSIS

Narrative analysis aims to identify the types of stories that are told through research and the types of stories that represent something of a cultural and social context. Researchers interpret stories that are told within the context of research and / or shared in everyday life. The preferred method of analysis of observation as a data collection method was the narrative analysis as well. It used stories and experiences seen during the observation period to answer the research questions.

3.7.3. VISUAL ANALYSIS

Visual analysis offers researchers an interdisciplinary method for understanding and interpreting images. (Schroeder, 2006). This form of analysis begins with description of what can be seen leading to better interpretation of the data collected. Basic descriptive work requires articulation of form, subject matter, genre, medium, color, light, line, and size – the building blocks of images. When working with photographs, for example, relevant descriptive variables include production qualities, the photographer's vantage point, focus and depth of field (Barrett, *Criticizing Photographs: An Introduction to Understanding Images.*, 2005). Visual analysis is a form of data analysis that works best in the case if works of art such as **photographs**.

3.7.4. THEMATIC ANALYSIS

Thematic analysis is the process of identifying patterns or themes within qualitative data (Moir Maguire, 2017). Thematic analysis focuses on distinguishable themes and patterns of living and/or behavior.

- The first step is to collect the data. From the transcribed conversations, patterns of experiences can be listed. This can come from direct quotes or paraphrasing common ideas (Aronson, 1994).
- The next step to a thematic analysis is to identify all data that relate to the already classified patterns (Aronson, 1994).
- The next step to a thematic analysis is to combine and catalogue related patterns into sub-themes. Themes are defined as units derived from patterns such as "conversation topics, vocabulary, recurring activities, meanings, feelings, or folk sayings and proverbs". When gathering sub-themes to obtain a comprehensive view of the information, it is easy to see a pattern emerging. When patterns emerge, it is best to obtain feedback from the informants about them (Aronson, 1994).
- The next step is to build a valid argument for choosing the themes. This is done by reading the related literature (Aronson, 1994).

3.8. DATA PRESENTATION METHODS

3.8.1. TEXTUAL PRESENTATION

The researcher gathered information from his case study and use textual presentation after the collection and analysis of data. Textual presentation is the rawest form of data presentation which would well accompany the use of the case study method. In this form of presentation, data is simply mentioned as a mere text, that is generally a paragraph. This form of data presentation was not only used to analyze the case study but was also used for the interviews as well as the observation method.

3.8.2. PHOTOGRAPHS

The primary data collected by the use of photographs was presented photographically and complimented by descriptions underneath each and every photo to give a clear, comprehensive and detailed pictorial nature and state of the site and their relevance to the study.

3.9. LOGICAL FRAMEWORK

The logical framework is a document that gives a complete idea of the aims, tasks and resources of a research project and provides information about external factors that can influence the project and, or rather, ideas (Logframer, 2012). All the information is presented in a table with rows and columns and variations may be made based on the nature of the project/research (Logframer, 2012). Based on the research of this study, table 2 below is a logical framework detailing the objectives of the study, the data needs, data sources, data collection tools, analysis methods and expected outputs for each of the objectives.

Table 3: Logical Framework

| OBJECTIVE 1: To determine and establish the challenges faced by autistic children in Nairobi and how product design can be used to tackle these challenges. | | | | |
|--|---|---|--|--|
| Data Needs | Data Source | Data Collection Tool | Analysis Method | Expected Output |
| Information on the challenges that children on the autism spectrum face due to their condition | 10 Autistic children 7 Committee members | Non-participant observation Semi-structured interviews | Visual analysis Thematic analysis | Knowledge on the challenges that autistic children face due to their condition |
| OBJECTIVE 2: To explore the challenges faced in aiding children affected by Autism at the Differently Talented Society of Kenya. | | | | |
| Data Needs | Data Source | Data Collection Tool | Analysis Method | Expected Output |
| Information on the challenges that parents, teachers and | 7 Committee members | Semi-structured interviews | Content analysis | Knowledge on the challenges that caregivers face in aiding |

| | | | | |
|---|---|--|---|--|
| caregivers face in aiding children within the autism spectrum | Parents of the autistic children Supporting staff members at the autism aiding societies | | | children on the autism spectrum |
| OBJECTIVE 3: To examine the available therapeutic products for children suffering from autism in Nairobi. | | | | |
| Data Needs | Data Source | Data Collection Tool | Analysis Method | Expected Output |
| Existing therapeutic and learning products used by children on the autism spectrum | Internet Parents of the autistic children | Review of literature Semi-structured interviews | Content analysis Thematic analysis | Knowledge on the available therapeutic products used by autistic children and their features. |
| OBJECTIVE 4: To establish how the Tingatinga art form and emotional design can be used to inspire products for the children. | | | | |
| Data Needs | Data Source | Data Collection Tool | Analysis Method | Expected Output |
| Information on the features of Tingatinga art and emotional design and their application in the design for | Internet sources Books on the subject | Review of literature Note taking | Content analysis | Knowledge on Tingatinga art and emotional design and how they can be applied in product design |

| | | | | |
|---|---|---|--|--|
| products for children | | | | for children on the autism spectrum |
| OBJECTIVE 5: To propose aesthetic products that can aid autistic children in their communication process and interactions with others. | | | | |
| Data Needs | Data Source | Data Collection Tool | Analysis Method | Expected Output |
| Information on ideal communication and interaction products that can be used by autistic children | 10 Autistic children 7 Committee members of autism societies | Non-participant observation Semi-structured interviews | Visual analysis Thematic analysis | Creation of products that can be used to improve communication and social interaction by autistic children |

PROJECT PAPER

CHAPTER 4

4.0 ANALYSIS & INTERPRETATION OF FINDINGS

4.1. INTRODUCTION

The researcher, in order to successfully analyze the subject matter, went to different institutions of learning and therapy establishments that accommodate children within the autism spectrum. These institutions included the main site, Differently Talented Society of Kenya, Autism Support Center and the Autism Society of Kenya. The researcher also visited several associate schools that support autistic children and these schools include City Primary in Nairobi, Mirema School and Kenya Community Center for Learning (KCCL). The aforementioned schools are schools that are able to accommodate children within the spectrum among other atypical children.



Figure 4.1: Parents of autistic children at a parents-teachers meeting at the City Primary School; (Source: the researcher)

Figure 4.1 shows a meeting held for autistic children caregivers by teachers at the City Primary School. These regular meetings are held to discuss issues facing the children and how those issues can be addressed; amongst them the judgement that is directed towards the autistic children based on behavior, interaction, communication among other differences that they have with atypical children.

One of the biggest challenges faced by children within the autism spectrum is the lack of a specific facility other than the Autism Support Center that aids children with autism. Figure 4.2 and 4.3 below show the kind of environment and products that are available for autistic children at the City Primary School in Nairobi.



Figure 4.2: The City Primary School, with the products and environment provided for the autistic children; (Source: the researcher)



Figure 4.3: Another image of the City Primary School; (Source: the researcher)



*Figure 4.5: The environment provided for autistic children at the Mirema School;
(Source: the researcher)*



*Figure 4.4: A view of the plain environments for autistic children at the Mirema School,
Nairobi; (Source: the researcher)*

Figure 4.4 and 4.5 above show the environment for autistic kids at the Mirema School.

4.2. CHALLENGES FACED BY CHILDREN WITHIN THE AUTISTIC SPECTRUM

To meet the requirements of objective one, which aimed at determining and establishing the challenges faced by autistic children in Nairobi, the researcher conducted research

through non-participant observation of the autistic children and semi-structured interviews with committee members of institutions that cater to autistic children in Nairobi. Based on the research conducted, the researcher uncovered that the children face four major challenges. These challenges are categorized into but are not limited to:

- Communication barriers
- Social skills
- Behavioral issues (Repetitive or peculiar behavior)
- Sensory Sensitivities

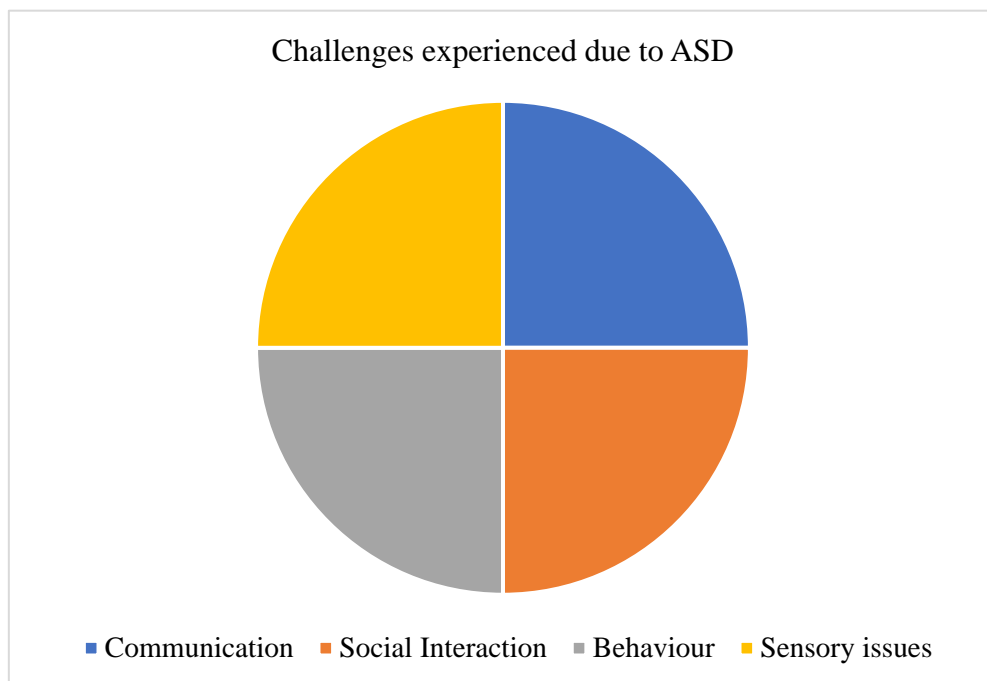


Figure 4.6: Chart showing the problems that autistic children face; (Source: the researcher)

These challenges, however, vary based on the specific child within the spectrum. Challenges faced by one child may differ completely from challenges faced by another child, though those challenges may exist within the same realm. For example, based on communication, one child may experience extreme withdrawals from those around him due to difficulties in communication whereas another child may opt for attention-seeking behavior trying more and more to connect and draw attention to himself or herself. Therefore, there are no standardized challenges, and after interaction with one child on the spectrum, a researcher may not draw any conclusion of the entire disorder.

4.2.1. COMMUNICATION

The researcher observed that children on the spectrum face challenges with various verbal and nonverbal skills, including grammar, proper use of pronouns and reactions to speech. Differences in other non-critical communication features, such as facial expressions and speech tempo, may result in what some perceive as 'awkwardness' in children with autism (Mundia, 2020).

Communication problems have always been considered a core feature of autism. Challenges in any of these areas can contribute to the social difficulties children on the spectrum experience (Mundia, 2020). Difficulties in communication also birth some of the other issues experienced such as frustration which leads to an eventual aggressive outpour by the autistic individuals.

Communication between people with and without autism is a two-way problem. Individuals on the spectrum may have communication challenges to address, but their typical peers and conversation partners could do more to meet them halfway by accepting differences in the way they express themselves. Due to the challenges in communication, children with autism result to the following means of communication:

4.2.1.1. ESCAPISM

In autism, escapism refers to the child opting to retreat from any interactions and partially or completely closing themselves off from communicating with anyone around them. Due to the frustrations that arise from not being able to effectively communicate their emotions, thoughts and feelings, and not being able to effectively decode those verbal and non-verbal cues by those around them, autistic children prefer to shut down and shut the world out completely. This leads to even further frustration and may cause more harm than good. They drift off into an alternate universe through art, books, technology or anything that they are good at or that they like, in order to feel safe.

4.2.1.2. ATTENTION-SEEKING BEHAVIORS

Attention-seeking behaviors are common in children with autism; and range from silly to defiant to violent behaviors. The researcher observed that in a child with autism, negative attention-seeking behaviors can be problematic and difficult to stop. They aren't necessarily a bad thing, just an effect of lack of proper communication decoding by the children on the autism spectrum.

At the very core, all humans are social creatures and crave attention, so when, in the case of autistic children, they feel like they're not getting enough or the right kind of attention, they naturally change their behavior in an attempt to get more of it. In this case, they either continuously do whatever activity they are doing continuously or throw fits. Another reason a child with autism might engage in an attention-seeking behavior is as a distraction to put off doing something they dislike, such as bath time, bedtime or even eating (Mundia, 2020).

4.2.1.3. AGGRESSION

The researcher found that children with autism spectrum disorder don't necessarily express anger, fear, anxiety or frustration in the same way as other children. They sometimes express these feelings through aggressive behavior towards others. Sometimes they're aggressive towards themselves, which is called self-injurious behavior. They might hit, kick, throw objects or hurt themselves (Mundia, 2020).

Children with ASD behave aggressively or hurt themselves because they:

- have trouble understanding what's happening around them – for example, what other people are saying or communicating non-verbally.
- can't communicate their own wants and needs – for example, they can't express that they don't want to do an activity or that they want a particular object.
- are very anxious and tense.
- have sensory sensitivities, like an oversensitivity to noise or a need for stimulation.
- want to escape from stressful situations or activities.

4.2.2. SOCIAL INTERACTION

The researcher uncovered that children on the autism spectrum vary enormously from each other but they all have impaired social skills of one kind or another (Mundia, 2020). Those social skills include **social interactions** (such as sharing interests with other people), the **use of non-verbal communication** (such as making eye contact), and the **development and maintenance of relationships** (such as making friends). Social interaction among children within the autism spectrum proves to be one of the hardest activities for them. This stems from their issues in communication. The difficulties they experience in encoding and decoding communication cues make it

close to impossible to fully interact with atypical adults and children alike (Mundia, 2020).

It was evident that children with autism appear neither to be interested in nor able to “read” the social world. It is as though they are blind to the animated, complicated, emotionally loaded give-and-take of human interaction. Other children appear to know, intuitively, how to communicate and interact with each other, and many parents of autistic children struggle to explain why their children struggle with social interaction when they can have astonishing skills in other areas (Mundia, 2020).

Children with autism also lack an important psychological wiring known as **theory of mind**. This refers to a social-cognitive skill that involves the ability to think about mental states (beliefs, desires, and intentions, which are used to understand why someone acts in a certain way), both your own and those of others (Mundia, 2020). Not only does the theory of mind involve thinking about thinking, but it also refers to the ability to understand that other people's thoughts and beliefs may be different from your own and to consider the factors that have led to those mental states (Cherry, 2018). A lack in this social-cognitive skill makes their expression of interest, love, beliefs and intention very different from everyone around them. An example of this is with the intention of showing love, children with autism may lack boundaries such as not understanding intimate and personal space and end up irritating the other party instead of receiving the response that they expected (Mundia, 2020).

4.2.3. BEHAVIORAL ISSUES

The researcher found out that one of the hallmark features of an autism spectrum disorder is the presence of restrictive and repetitive behaviors, interests, and activities (Institute, n.d.). The children may engage in stereotyped and repetitive motor movements (hand flapping or lining up items) or speech (echolalia) (Institute, n.d.). They may emphasize harmony, such as needing to take the same route to school every day or demanding that tasks be completed in the same sequence and at the same time. When other children are prevented from repetitive behavior or when changes in the process are required, they may feel overwhelmed and engage in more problematic behaviors, such as aggression, to gain access to the routine or discouraging others from changing the process (Mundia, 2020).

It was evident that decline, repetition and programming could be a source of enjoyment for independent children and a way to deal with daily life. But they can also limit their participation in other activities and cause grief or anxiety.

For many people, the change in the idea of repetitive behavior took time. Restricted and repetitive behaviors are a basic feature of autism and include not only the frequency of repetitions such as hand-flapping, but also intense interest in specific topics - such as train schedules or maps - and the difficulty of changing routes (Institute, n.d.). They have often been viewed as something to eliminate or at least minimize, especially if they appear to hinder a child's daily life. Studies, however, suggest that some of the behaviors, such as body-rocking and arm-waving, help guide typical development (Mundia, 2020). And many non-autistic children also engage in stims such as fidgeting or fiddling with objects. What's more, a growing body of evidence from the past decade reinforces the notion that repetitive behaviors can help autistic people relieve sensory overload, cope with anxiety and express emotion (Institute, n.d.).

The researcher uncovered that repetitive behaviors can also be viewed as a positive rather than something negative and this can be argued in the sense that repetition of certain behaviors may lead to stellar performance and even excellence and mastery of some of the crafts that the autistic children involve themselves in. An example is a child that continuously flaps or engages in stimming. Those senses may be quenched by the use of a piano which because of the repetitive nature of their behavior may lead to a mastery of the craft. This may also be seen in autistic children who engage themselves in physical activities such as sports. The repetitiveness and routine that their mind follows may lead to excellence in these activities and eventually making them stellar.

4.2.4. SENSORY SENSITIVITIES

Sensory issues often accompany autism. Autism's sensory issues can involve both hyper-sensitivities (over-responsiveness) and hypo-sensitivities (under-responsiveness) to a range of stimuli. Many children on the Autism spectrum have difficulty processing the details of everyday feelings. Any feeling can be over- or under sensitivity, or both, at different times. These differences can affect behavior and can have a profound effect on a person's health (Mundia, 2020).

The research revealed that children with autism spectrum disorder (ASD) can be oversensitive or under sensitive to noise, light, clothing or temperature. Their senses -

sight, hearing, touch, smell and taste - absorb too much or too little information from their surroundings. Adolescents often have emotional feelings, but they often withdraw. These feelings usually last longer in children with ASD, though they diminish over time.

It was observed that when children with ASD are oversensitive or overreactive to sensory experiences, it's called hypersensitivity. These children might cover their ears when they hear loud noises or eat only foods with a certain texture (Jamal, 2019). When children are under sensitive or under reactive to their environment, it's known as hyposensitivity. These children might wear thick clothes on a hot day, or repeatedly rub their arms and legs against things (Jamal, 2019).

Sometimes an autistic child may behave in a way that one wouldn't immediately link to sensory sensitivities. A child who struggles to deal with everyday sensory information can experience sensory overload, or information overload. Too much information can cause stress, anxiety, and possibly physical pain. This can result in withdrawal, challenging behavior or meltdown.

4.3. CHALLENGES FACED IN AIDING CHILDREN WITH AUTISM

To meet the requirements of objective two, which aimed at exploring the challenges faced in aiding children affected by Autism at the Autism centers, the researcher conducted research through semi-structured interviews with committee members and supporting staff of institutions that cater to and parents of autistic children in Nairobi. Institutions, caregivers and parents, especially those new to dealing with children on the autism spectrum experience great difficulty in nurturing autistic children. These challenges stem from those faced by the autistic children in their daily activities.

4.3.1. COMMUNICATION

It was evident that based on their communication issues, there is persistent difficulty in getting through to a child with autism. Due to their inability to decode and properly encode communication cues, anyone trying to aid a child on the autism spectrum may face great struggle. This leaves a gap of understanding between the two parties which may lead to even worse results such as withdrawal of the children on the spectrum.

4.3.1.1. SOLUTION: SPEECH THERAPY

The researcher found out that to tackle this issue, most children with autism are taken through **speech therapy** (Jamal, 2019). This allows them to learn how to effectively communicate and how to interpret communication verbal and non-verbal cues from other parties. Another means through which this challenge of communication may be dealt with is through the use of products. Several products have been made in order to allow children with autism to communicate using. These products allow them to communicate their thoughts, feelings and emotions to the caregivers who can then proceed to deal with the problems being faced. These products grow important with regards to taking care of children on the autism spectrum (Jamal, 2019). See fig 4.7:



Figure 4.7: Products used for speech therapy at City Primary School in Nairobi; (Source: researcher)

4.3.2. INTERACTION

Because children with autism suffer with regards to social interaction, this proves difficult for caregivers because they experience resistance from the children in an attempt to assist them. The researcher observed that children on the autism spectrum withdraw from general interaction with their caregivers and may result to aggressive behavior when interaction is required. This prevents any aid that would've been given to them from being effective. With these challenges in interaction, dealing with children on the autism spectrum and aiding them in their activities may be interfered with.

4.3.2.1. SOLUTION: PLAY THERAPY/ SPORTS/ PHYSICAL ACTIVITIES

The research revealed that **play therapy** and **sports** or **physical activities** are implemented as a solution to social interaction issues. The children are allowed to play, and other children or adults slowly incorporated into their environment, in a way that does not make them uncomfortable but otherwise invites more attention. This allows for them to make their previously uncomfortable environment easier for them to get accustomed to due to the distractions provided by the play products that they use. Sports also allow them to learn the essence of teamwork as well as burn off the excess energy some of them may be holding onto (Jamal, 2019). This prevents any situation where they go through sensory overload. The energy that may have been used in aggressive behavior is then converted and used in specific physical activities. They get to do these physical activities alongside other children, which introduces individuals into their environment in a non-threatening way. Figures 4.8 and 4.9 show these activities.



Figure 4.8: Two autistic children at the City Primary School during play therapy in the presence of two caregivers; (Source: the researcher)



Figure 4.9: A group of autistic and non-autistic children involved in sports at the Mirema School in Nairobi; (Source: the researcher)

4.3.3. BEHAVIORAL ISSUES

Behavioral issues that autistic children face or go through end up affecting the caregivers and parents as well. The researcher found out that children with ASD often like predictable environments, and they can get very upset if their familiar routines are broken. For example, the child might be upset if you change the route, they usually take home from school. This causes a great rift in interaction between the child and their respective caregivers (Mundia, 2020). The child might also not understand it's time to move on from one activity to another. Or like typically developing children, she just might not want to. The child might also get upset if too much is happening around him/her, or if she finds a particular noise overwhelming, or it's too bright for her. These behavioral issues may make caregiving very difficult to tackle in respect to ASD.

4.3.3.1. SOLUTION: BEHAVIORAL THERAPY

Behavioral therapy allows for the caregiver to influence reactions, behaviors and response of the autistic child to specific environments and people. It is majorly done to allow the child to not only adapt well to any environment but also to be self-sufficient in certain areas in their lives (Jamal, 2019). It helps change how they think and how they adjust to new situations in life. Behavioral therapy can be done through talking but the most effective way is through certain activities and by the use of certain products. Figures 4.10 and 4.11 show examples of caregivers implementing behavioral therapy.



Figure 4.11: Behavioral therapy otherwise executed through an art class; (Source: the researcher)



Figure 4.10: Behavioral therapy executed through the use of a trampoline at the City Primary School; (Source: the researcher)

4.4. CHALLENGES FACED BY AUTISTIC CHILDREN DURING PRODUCT INTERACTION

In regard to therapy, the autistic children ought to be exposed to a lot of products that facilitate their well-being. However, the researcher found out that their interaction with products is very different from interaction of atypical children with products. Unlike the aforementioned group, children within the autism spectrum experience the following challenges in their interaction with products:

4.4.1. FOCUS

The research revealed the children have very specific focus and concentration in regard to product interaction. They focus on specific parts of the product instead of interacting with the product as a whole (Mundia, 2020). An example is when interacting with a toy car, a child on the autism spectrum may only focus on interacting with the rotating wheel rather than the whole toy car. This takes away from proper immersion in product usage and therefore impairs judgement and their reaction to the product at hand. The solution for this is to create whole products that capture and maintain the attention of the children; products that allow the children to interact with all sections and parts.

4.4.2. DISTRACTION

Distraction greatly interferes with product interaction. The researcher found out that children on the spectrum are highly visual and highly sensitive to environments and that may lead to a challenge in product interaction (Jamal, 2019). They are easily distracted by external factors outside their product immersion. This then hinders proper therapy based on whatever the product is used for. They can get distracted by things as simple as sounds and nature to things such as moving parts in objects such as fans. These distractions sometimes seem harmful and harsh to the children even in situations where they aren't (Mundia, 2020).

4.4.2.1. ATTENTION SPAN

In regard to attention span, the researcher observed that autistic children may suffer from either a short attention span to a very high attention span. The former may be caused by their Attention Deficiency Disorder and thus sees them unable to fully concentrate on one product for a prolonged period of time. This then leads to failed efficiency in the products being used. The other challenge associated with attention span is high attention span. This sees very prolonged concentration which means the child solely focuses on that one product for a very long time (Mundia, 2020).

4.4.2.2. RESISTANCE TO ADAPT

On interaction with certain products, it was evident that children on the autism spectrum may be resistant to interact with different products once change is required or desired. For example, if the child is required to switch from one specific puzzle to a different one, he/she may be unwilling to use the new puzzle. This may also be in terms of texture. After interaction with several products of the same texture, e.g. smooth, the child may resist interacting with a product of different texture such as a rough item.

4.5. AUTISM THERAPY PRODUCTS

Based on the research carried out by the researcher, autism therapy products available in Kenya are not only minimal but are also acquired through importation. Basic products that are used are normal products used for atypical children in kindergarten. Other products, those found at the Autism Support Center have been imported due to insufficient access to autistic therapy products in Kenya.

The researcher uncovered that the products adhered to the following characteristics:

4.5.1. COLOR:

The products used by children within the autism therapy found at the Autism Support Center were colorful in order to be able to engage the children and capture their attention. The colors stick to primary and secondary colors to ensure that the colors are not too harsh and cause an eventual sensory overload (Jamal, 2019). Figure 4.12 shows the range of colors used for products for autistic children. Figure 4.13 shows the implementation of the colors on the products used for autism.



Figure 4.12: Range of colors that are appropriate for autistic children; (Source: the researcher)



*Figure 4.13: Products used by autistic children maintaining primary and secondary colors;
(Source: the researcher)*

4.5.2. TEXTURE:

The researcher uncovered that autistic children are exposed to different textures to enable them to stimulate their sensory nerves (Jamal, 2019). Exposing them to similar types of textures may cause sensory overloads once they're exposed to a different type of texture and they may end up throwing fits eventually (Mundia, 2020). Their products, therefore, contain different textures, ranging from smooth to different kinds of rough as seen in fig.4.14.



Figure 4.14: Different textures on the step, balance balloon and trampoline; (Source: the researcher)

4.5.3. BALANCE

The products aim to provide support and balance in order to allow the sensory stimulation in the backbone and eventually, the spinal cord (Jamal, 2019). Therefore, the products are built to facilitate balance by suspension or by sitting, as shown in figure 4.15.



Figure 4.15: Two products that facilitate balance, one through sitting and one through suspension; (Source: the researcher)

PROJECT PAPER

CHAPTER 5

5.0 SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. INTRODUCTION

The chapter looks into and makes a summary the findings presented in the previous chapter. Thereafter, in relation to the objectives and research questions, the researcher made a summary of the findings so as to develop appropriate recommendations and later sought to make conclusions. The recommendations made pertaining effective products for autistic children in Nairobi, facilitating their communication and how Tingatinga art can be incorporated in the production of these products. All data is based on the information collected by the researcher through interviews, photograph and observation at the Differently Talented Society of Kenya, Autism Support Center and autism associated schools such as Mirema School, City Primary and the Kenya Community Center for Learning.

5.2. SUMMARY OF DATA ANALYSIS /FINDINGS

Based on the data collected by the researcher from the sample population of autistic children and their caregivers at the associated institutions, it was discovered that the children's products have to be able to facilitate an experience between the children and the products themselves. They also have to be able to expose them to different environments and textures during their interaction. A great flaw was observed in the communication process that children within the autism spectrum are involved, and to facilitate proper communication then products have an upper hand in easing the process. The products must also offer some kind of therapy to the children, neutralizing their sensory and behavioral sensitivities.

Characteristics of the products used were also uncovered and have to be adhered to. They include color, texture and balance. In regard to the proposed products, the researcher would then have to adhere to these specific characteristics.

5.3. RECOMMENDATIONS

Based on the issues that the researcher uncovered during study, certain solutions were recommended.

The main way through which the researcher aims at solving the problems that autistic children face in their day to day activities, was by the creation of products that would facilitate meditation, communication and interaction as the main issues being solved. These products would be used in an Autism Center in Nairobi and would be specific to the classroom, sensory room and the children’s garden. The products created would be inspired by Tingatinga art and follow the principles of emotional design. The space would entirely be dedicated to children within the autism spectrum.

5.3.1. INSPIRATION: TINGATINGA ART

The recommended products for creation would be inspired by the East African Tingatinga Art.



Figure 5.1: Mood board showing the inspiration drawn to create the products; (Source: the researcher)

Figure 5.1 is a mood board showing the inspiration of the products and the features extracted from Tingatinga art. Tingatinga art was chosen due to its relatability with

regard to children. The aspects of forms drawn from nature, naïve forms and exploration with bright colors make it effective when dealing with children.

5.3.1.1. BRIGHT COLORS

Tingatinga art focuses on the intense use of bright colors and in the same way, children on the autism spectrum need bright colors as well to trigger their sensory nerves (Jamal, 2019). The researcher will therefore apply bright colors in her products but ensure that the colors are subtle as well by sticking to primary and secondary colors as seen in fig.5.2. This is because use of harsh colors may lead to sensory overloads in the autistic children.



*Figure 5.2: Sample of interpreted colors the researcher will apply in product development;
(Source: the researcher)*

5.3.1.2. PATTERNS

Another major characteristic of Tingatinga art is the dense incorporation of prints in the pieces of work as seen in figure 5.3. In its application to products for autistic children, however, the prints cannot be applied as intricately as is in Tingatinga art due to the

possible causing of sensory overload for the children. In this case, the researcher intends on applying the prints in form of texture, which is a very important component of autism products. Texture allows for sensory stimulation in the children which is more advantageous in their therapy.



Figure 5.3: Example of prints extracted from Tingatinga art; (Source: the researcher)

5.3.1.3. NATURE

Details in Tingatinga art are mainly drawn from nature in form of animals, plants, physical features, among others and these details are easily relatable to children. Most products would therefore follow the format of things that occur in nature. This also helps the children to create a connection with the products and therefore allows for better therapy.

5.3.1.4. NAÏVE FORMS

Another vital quality of Tingatinga art to be applied is the application of very naïve forms in regard to the subject matter as seen in figure 5.4. This simplifies the interpretation of the stories being told and, in this case, this quality is very convenient when dealing with children. The products, as aforementioned will be inspired by things

that exist within the environment. These inspirations, however, will be simplified and their forms stripped down to the very essentials of the subjects just as in Tingatinga art.



Figure 5.4: Simplistic naive forms of animals extracted from Tingatinga art; (Source: the researcher)

5.3.2. MATERIALS

Based on the research, purpose of the recommended products and the target audience being children under the age of 12, the materials chosen for the creation of these products have to be conducive for the kids. In this case, the more fragile materials would be used for products that the children don't often interact with.

The materials below are those recommended by the researcher:

5.3.2.1. RUBBER

For the purposes of the research, the researcher would apply the use of silicone rubber. Silicone rubber, shown in figure 5.5, is recommended for its resistance to high temperatures, its malleability and the fact that it comes in different colors. It's used for food storage containers, medical equipment, baby care items, as seen in figure 5.6 among other things. Due to its expensive nature, it has been replaced with synthetically produced silicone rubber, which works just as well and would be one of the researcher's preferred materials.



Figure 5.6: An example of a silicone sheet; (Source: rubbersheetwarehouse.com)



Figure 5.5: Several chewy tubes made for autistic children from silicone rubber; (Source: amazon.com)

5.3.2.2. WOOD

The researcher would use wood for the creation of products for the kids as wood is structurally very strong but also maintains its non-brittle and impact resistant nature. With well smoothed edges, the wooden products would be safe for use by the autistic children. Figure 5.7 shows several examples of children's products made from wood.



Figure 5.7: Some of kids' therapeutic products made of wood; (Source: littlewoodenwonders.com)

5.3.2.3. LEATHER

Unlike other natural fibers like cotton and silk, leather feels much more comfortable against the skin and in the case of children, this would be the best option for products for kids. Its flexibility and durability also add to the benefits of using it. Leather would be appropriate for products such as the flooring of the sensory room and the products for balance through suspension as seen in figure 5.8.



Figure 5.8: Examples of therapeutic leather products; (Source: arktherapeutic.com)

5.3.2.4. METAL, SOAPSTONE, CLAY

For sculptural products the researcher opted to use materials such as metal, soapstone and clay. This is because the children would not directly interact with the products, therefore preventing any injuries on the children or harm on the objects.

5.3.2.5. PAPYRUS, SISAL

The researcher also explored natural materials such as papyrus and sisal. These materials were not only explored to introduce sustainability into the research but to also introduce texture into the materials. As aforementioned, texture is a very important aspect of the products created for autistic children and these materials would introduce proper, natural texture into the products.

5.3.3. RECOMMENDED PRODUCTS

Upon uncovering the problems that the researcher did, she collectively came up with a range of products that would serve the purpose of her research. The table below shows the recommended products for the Autism Center in Nairobi:

Table 4: Table showing the range of recommended products

| UNIT | INSPIRATION | PRODUCT | MATERIAL | PROCESS | NO. OF PIECES |
|---------|----------------|------------------|------------------|--------------------------|---------------|
| LEATHER | Tingatinga Art | Therapeutic nest | Leather, papyrus | Welding, Weaving, Sowing | 1 |
| | | Wall hanging | Leather, metal | Sowing, Welding | 1 |
| | | Bird seat | Leather, papyrus | Welding, Weaving, Sowing | 1 |
| | | Floor mat | Leather | Sowing | 1 |

| | | | | | |
|-----------|----------------|------------------------|--------------------------|------------------------------|---|
| JEWELLERY | Tingatinga Art | Wind chimes | Metal, bone, glass beads | Welding, Assembling | 2 |
| | | Chewy tubes | Rubber, | Assembling | 3 |
| | | Lanterns | Metal, ceramic beads | Assembling, Welding, Weaving | 2 |
| CERAMICS | Tingatinga Art | Meditative lantern | Clay | Throwing | 2 |
| | | Plant pot set | | Hand building | 3 |
| | | How do you feel bowls | | Throwing, Carving | 3 |
| SCULPTURE | Tingatinga Art | Lotus flower sculpture | Soapstone | Carving | 1 |
| | | Bird sculpture | Wood, Metal | Carving, Assembling | 3 |
| | | Caterpillar seats | Wood, Leather | Carving, Sowing | 2 |
| | | How do you feel bowls | Wood | Cutting, Carving | 1 |
| | | Balance stool | Wood | Carving, Assembling | 1 |

The products recommended above serve specific functions that assist the overall wellbeing of the autistic children. The table below clearly lists the functions that each product serves, the material of choice and the number of pieces per product.

Table 5: Table showing the functions performed by each product

| UNIT | PRODUCT | MATERIAL | FUNCTION | NO. OF PIECES |
|-----------|------------------|--------------------------|---|---------------|
| LEATHER | Therapeutic nest | Leather, papyrus | Relaxation and Meditation for kids who are throwing a fit | 1 |
| | Wall hanging | Leather, metal | Inspiration and overall aesthetics of the space | 1 |
| | Bird seat | Leather, papyrus | Calming the children during a sensory overload | 1 |
| | Floor mat | Leather | Floor protection, ensuring that the children do not hurt themselves while playing or while angry | 1 |
| JEWELLERY | Wind chimes | Metal, bone, glass beads | Mobile sculpture that induces calmness or relaxation through production of movement and sound | 2 |
| | Chewy tubes | Rubber, | Prevent self-harm during times of sensory overload as the kids could exert all that energy into the tubes | 3 |
| | Lanterns | Metal, ceramic beads | Provide meditative lighting, by casting shadows and | 2 |

| | | | | |
|-----------|------------------------|---------------|--|---|
| | | | producing sound simultaneously | |
| CERAMICS | Meditative lantern | Clay | Provide meditative lighting | 2 |
| | Plant pot set | | Introduce a green environment into the sensory room and classroom | 3 |
| | How do you feel bowls | | Communication: provides a way through which the children communicate without using words | 3 |
| SCULPTURE | Lotus flower sculpture | Soapstone | Natural sculpture which would act as a meditative sculpture as it would contain water. | 1 |
| | Bird sculpture | Wood, Metal | Natural sculpture that would aesthetically add to landscape | 3 |
| | Caterpillar seats | Wood, Leather | Social interaction: allows the kids to sit and interact together as they could join and take them apart together | 2 |
| | How do you feel bowls | Wood | Communication: provides a way through which the children communicate without using words | 1 |
| | Balance stool | Wood | Assist with balance and therefore facilitating sensory stimulation | 3 |

The creation of the products follows a specific order through which the sketches are successfully transformed into the final products. It also requires a very specific set of tools for the processes. The table below lists in detail the materials, tools and production processes of each proposed product.

Table 6: Table showing the tools and production processes of the products

| UNIT | PRODUCT | MATERIAL | TOOLS | PRODUCTION PROCESS |
|-----------|------------------|--------------------------|---|--|
| LEATHER | Therapeutic nest | Leather, papyrus, metal | Hacksaw, Mallet, Electrode holder, Earth clamp, Wire cutters, Pliers, Welding machine, Leather shears, Needle, Thread | Welding, shaping, weaving, sowing, shaving |
| | Wall hanging | Leather, metal | Hacksaw, Mallet, Electrode holder, Earth clamp, Wire cutters, Pliers, Welding machine, Leather shears, Needle, Thread | Welding, cutting, sowing, gluing, |
| | Bird seat | Leather, papyrus | Leather shears, Needle, Thread | Welding, shaping, weaving, sowing, smoothing the edges |
| | Floor mat | Leather | Leather shears, Needle, Thread | Cutting, sowing, thonging |
| JEWELLERY | Wind chimes | Metal, bone, glass beads | Chain, Pliers, Saw, Claw | Welding, assembling the beads, hanging, joining |

| | | | | |
|-----------|------------------------|----------------------|--|--|
| | | | hammer, Tape measure, Saw, Chisel, Screw driver | |
| | Chewy tubes | Rubber, | Crimpers, Strippers, Cutters | Cutting, sowing, crimping, hanging |
| | Lanterns | Metal, ceramic beads | Hacksaw, Mallet, Chain, Pliers, | Welding, weaving, assembling |
| CERAMICS | Meditative lantern | Clay | Potter's wheel, Cutting wire, Kiln, Needle tool, Thread, Claw hammer, Tape measure, Chisel, Saw, Ceramic glaze | Throwing, engraving, sanding, firing, glazing, firing, sowing |
| | Plant pot set | | Potter's wheel, Cutting wire, Wooden modelling tools, Kiln, Paint | Hand building, joining, sanding, firing, painting |
| | How do you feel bowls | | Knife, Wooden modelling tools, Kiln, Ceramic glaze | Slab making, joining, sanding, firing, glazing, firing |
| SCULPTURE | Lotus flower sculpture | Soapstone | Saw, Chisel, Hammer | Sawing, sketching, carving, sanding, washing, drying, painting |

| | | | | |
|--|-----------------------|---------------|--|---|
| | Bird sculpture | Wood, Metal | Claw hammer, Tape measure, Chisel, Screw driver, Hacksaw, Mallet, Electrode holder, Earth clamp, Wire cutters, Pliers, Welding machine | Welding, cutting, carving, sanding, joining, painting |
| | Caterpillar seats | Wood, Leather | Claw hammer, Tape measure, Chisel, Hacksaw, Screw driver, Scissors, Thread, Needle | Cutting, assembling, carving, sanding, stuffing, sewing |
| | How do you feel bowls | Wood | Claw hammer, Tape measure, Saw, Chisel, Screw driver, Paint, Paintbrush | Cutting, shaping, adjoining, sanding, painting |
| | Balance stool | Wood | Claw hammer, Tape measure, Chisel, Screw driver, Saw | Cutting, shaping, adjoining, sanding, painting |

5.3.3.1. LEATHER

Leather, as aforementioned provides a very comfortable material on the skin. Thus, the recommended products would include a leather wall hanging with an inspirational script, a protective floor mat for the rooms, a therapeutic nest for a meditative nest for the kids and two bird seats that would help in calming the kid during a sensory overload. Figure 5.9 below shows some of the recommended sketches for the leather products.

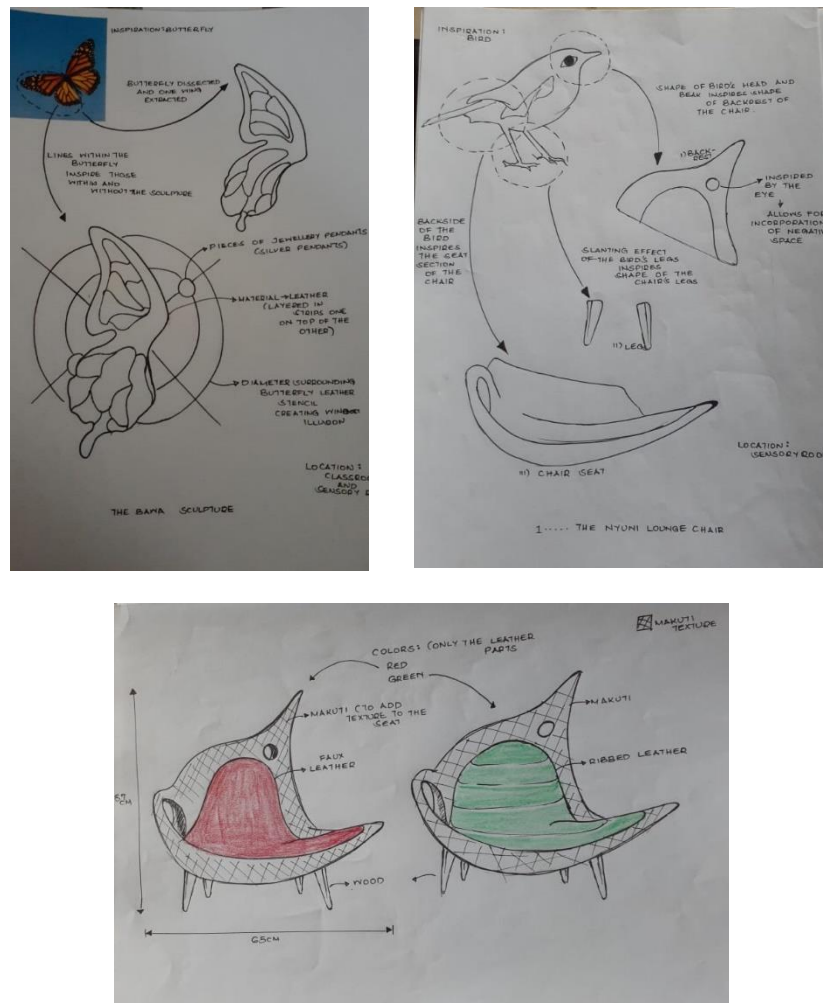


Figure 5.9: Sketches that show the proposed leather products; (Source: the researcher)

5.3.3.2. SCULPTURE

Sculptures would be applied by the use of wood, soapstone, metal and leather. The sculptures would include a soapstone lotus flower sculpture, balance stools, natural bird sculptures as well as how do you feel bowls which would facilitate communication among the children. Figure 5.10 shows a sample of sketches of the sculptural products proposed by the researcher.

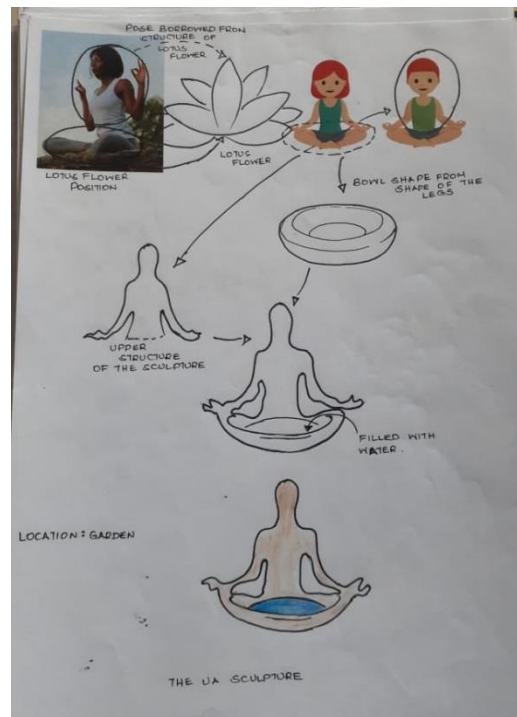
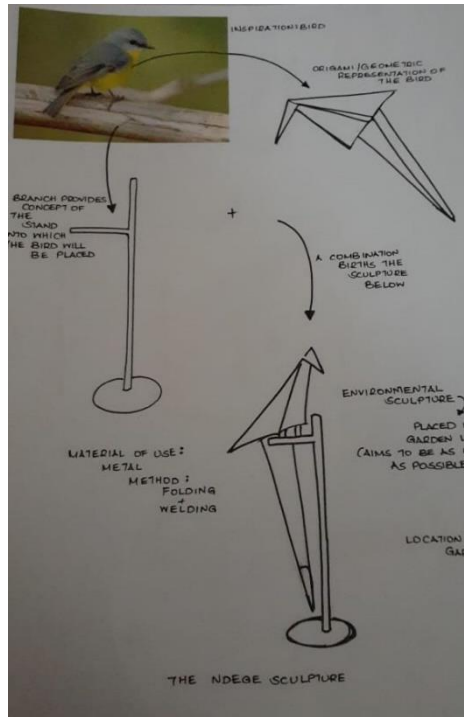


Figure 5.10: Sketches that show the proposed sculptural products; (Source: the researcher)

5.3.3.3. CERAMICS

Due to the fragility of ceramic products around children, the ceramic products would include sculptural products and products that the children would not directly interact with. An exception would be the how do you feel bowls which would facilitate communication. The other products include a lantern which would provide meditative lighting and a plant pot set. Figure 5.11 shows sketches for the ceramic products.

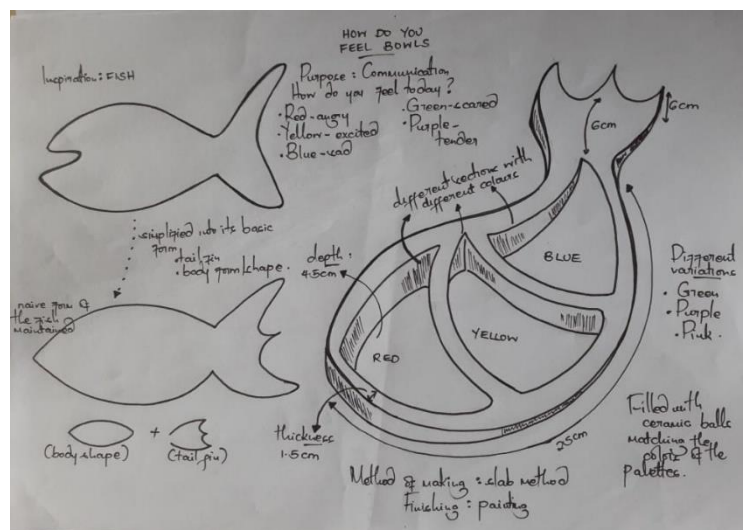
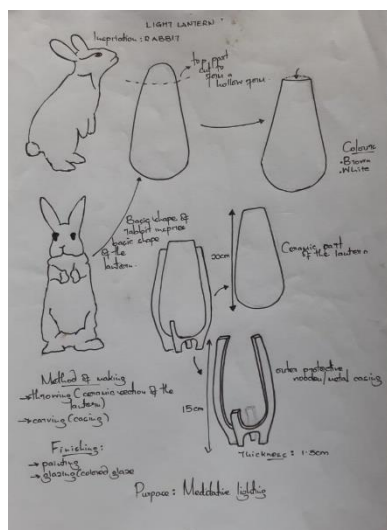


Figure 5.11: Sketches of the proposed ceramic products; (Source: the researcher)

5.3.3.4. JEWELRY

The jewelry pieces would be integrated into other pieces such as the sculptural and the leather products. The main jewelry products include wind chimes, which is a soothing mobile sculpture, a lantern made of glass beads that would also act as meditative lighting by casting soothing shadows and producing sound and chewy tubes made of rubber that would help during fits and sensory overloads. Figure 5.12 shows proposed sketches of a sample of jewelry products.

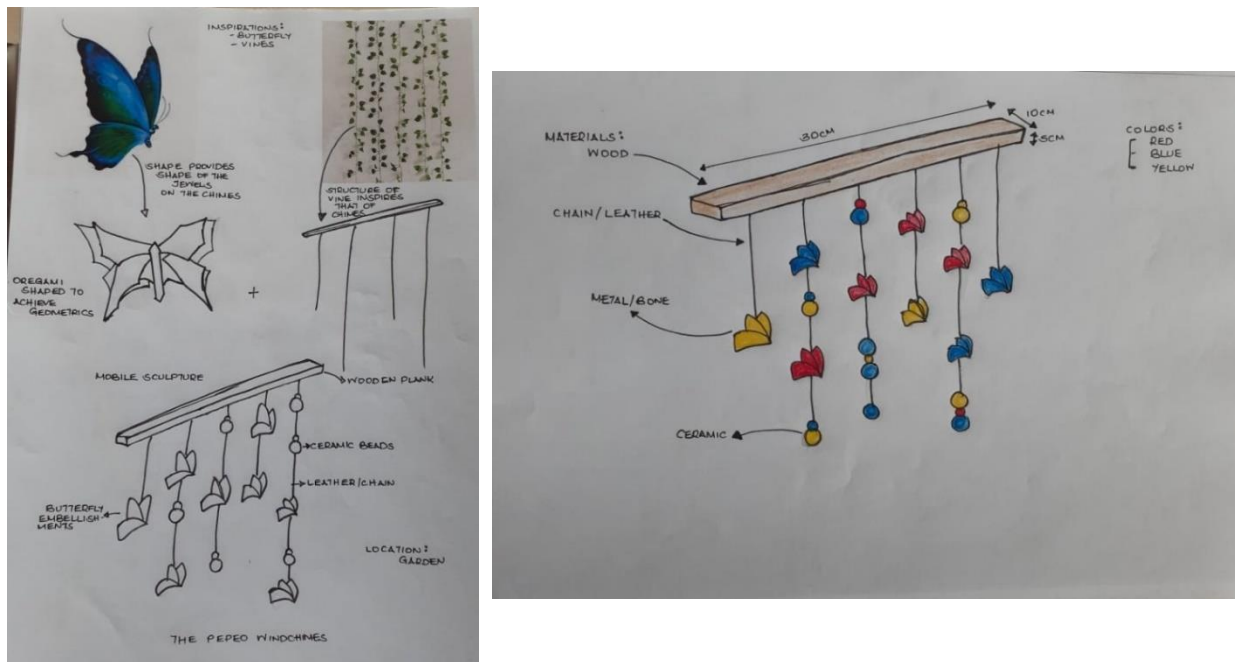


Figure 5.12: Sketches of the proposed jewelry products; (Source: the researcher)

5.4. SUGGESTIONS FOR FURTHER STUDY

The research focused solely on the product solutions for children within the autism spectrum. However, further research can be done for more developmental cases such as down syndrome, cerebral palsy and attention-deficit/hyperactivity disorder. The research can also be adopted for learning disabilities such as dyslexia and impairments in other academic areas such as intellectual disability. Other researches may also explore the adoption of African games and social design to create products for childhood and developmental disabilities.

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APPENDICES

INTERVIEW GUIDE

COMMITTEE MEMBERS

1. What is Autism?
2. What is the prevalence of autism in Kenya and specifically in Nairobi?
3. What are the challenges that children facing Autism experience?
4. Having a front seat to witnessing Autism, what are the main challenges kids with Autism face?
5. What centers of learning are currently present in Nairobi for children within the Autism spectrum?
6. What are the available treatment and therapy methods for the autistic children?
7. What are the products used for these treatment and therapy methods?
8. Which are the most vital products of use during these treatment sessions?
9. What challenges do the children face during interaction with the products?
10. Which are the main characteristics and qualities for the products used by the children within the Autism spectrum?
11. What suggestions would you offer for products and the environments provided for children with Autism in Nairobi?
12. What suggestions for adaptations of products that can be used by parents with autistic children would you offer?

INTERVIEW GUIDE

CAREGIVERS

1. Having a front seat to witnessing Autism, what are the main challenges kids with Autism face?
2. What are the available therapeutic products for children suffering from Autism in Nairobi?
3. What are the main challenges faced in aiding children within the Autism spectrum?
4. What challenges are faced by caregivers during interaction with therapeutic products?